ANNUAL REPORT ICTJA - CSIC 2016

INSTITUTE OF EARTH SCIENCES JAUME ALMERA

MINISTERIO DE ECONOMÍA, INDUSTRIA Y COMPETITIVIDAD

CSIC
CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

ICTJA
INSTITUT DE CIÈNCIES DE LA TERRA JAUME ALMERA

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Cover image: Margerie Glacier (Alaska, USA). Author: Miquel Àngel González. This image was the winner of the "ICTJA-CSIC Photo Contest 2016".

FOREWORD

José-Luis Fernández-Turiel
Director

The Institute of Earth Sciences Jaume Almera of the Spanish Scientific Research Council (ICTJA-CSIC) in Barcelona was established in the year 1965 focusing on Earth Sciences. Its name recalls the early days of research in Geology in the late nineteenth century and early twentieth century, paying tribute to Jaume Almera, an expert in the geology of Catalonia with international renown.

From its earliest days in 1965 as a new Geology institute in Barcelona, it has evolved to become an innovative and dynamic centre, with international relevance in the field of Earth Sciences. Our history is of all those who helped to establish the Institute with enthusiasm and perseverance, contributing to the research work of CSIC as a whole. The ICTJA's mission and vision will continue to keep alive our passion for advancing knowledge of Earth Sciences with rigor and dedication.

The Institute belongs to the Spanish Scientific Research Council (CSIC), a state agency dedicated to the promotion, coordination, development and dissemination of scientific and technological research, as well as staff training and advice to public and private entities.

Earth Sciences study the Earth's system, but they are about much more than that. They engage intellectual inquiry through interrogating the world in which we live to contribute to a future in which we want to live. Earth Sciences are particularly relevant today in many aspects of our everyday life. From the Antarctica to the Caribe, from the Mediterranean to the dessert of Atacama and the Puna in the Andes, from the Pacific coast of Asia to central Asia, ICTJA-CSIC scientists work examining the Earth's Systems through their particular specialties covering many time and space scales. Cutting across the traditional disciplinary boundaries of geology, physics, chemistry, biology and mathematics, and using advanced instruments, ICTJA-CSIC seeks to advance the understanding the geologic processes and materials to meet industrial and social needs with knowledge transfer applied to geohazards and exploration and exploitation of geological resources.

We take great pride of the integration of graduate students and technicians in our research efforts. The aim is to promote the creative thinking and the ability to develop independent and original research. Our research activities are strongly supported by the specialized technical and administrative staff available in our scientific, technical and administrative services.

This Annual Report 2016 describes the scientific activity of the four research groups: Structure and dynamics of the Earth, Environmental changes in the geological record, Geophysical and geochemical modelling of geological hazards and resources, and Crystallography and optical properties. The service units and laboratories section outlines the major capacities of these infrastructures. The ICTJA 10 highlighted papers section allows obtaining a fast snapshot of our research. The following sections rounds off this Report with a look to training, outreach activities and media presence, international collaboration, editorial activities, and finally a summary of the ICTJA big numbers for 2016.

ICTJA AT A GLANCE

Playa de las Catedrales, Spain. (Author: Angel Valverde)

Our Mission

ICTJA is an international geosciences research institute of excellence whose mission is to advance the understanding of Earth System Science. We will achieve this by applying advanced (forefront) experimental and analytical methodologies to well-defined, knowledge-driven research objectives. A key part of our mission is to meet industrial and societal needs through knowledge transfer applied to geohazards and exploration and exploitation of geological resources. Central to our mission is quality training of the next generation of Earth Science researchers and technicians.

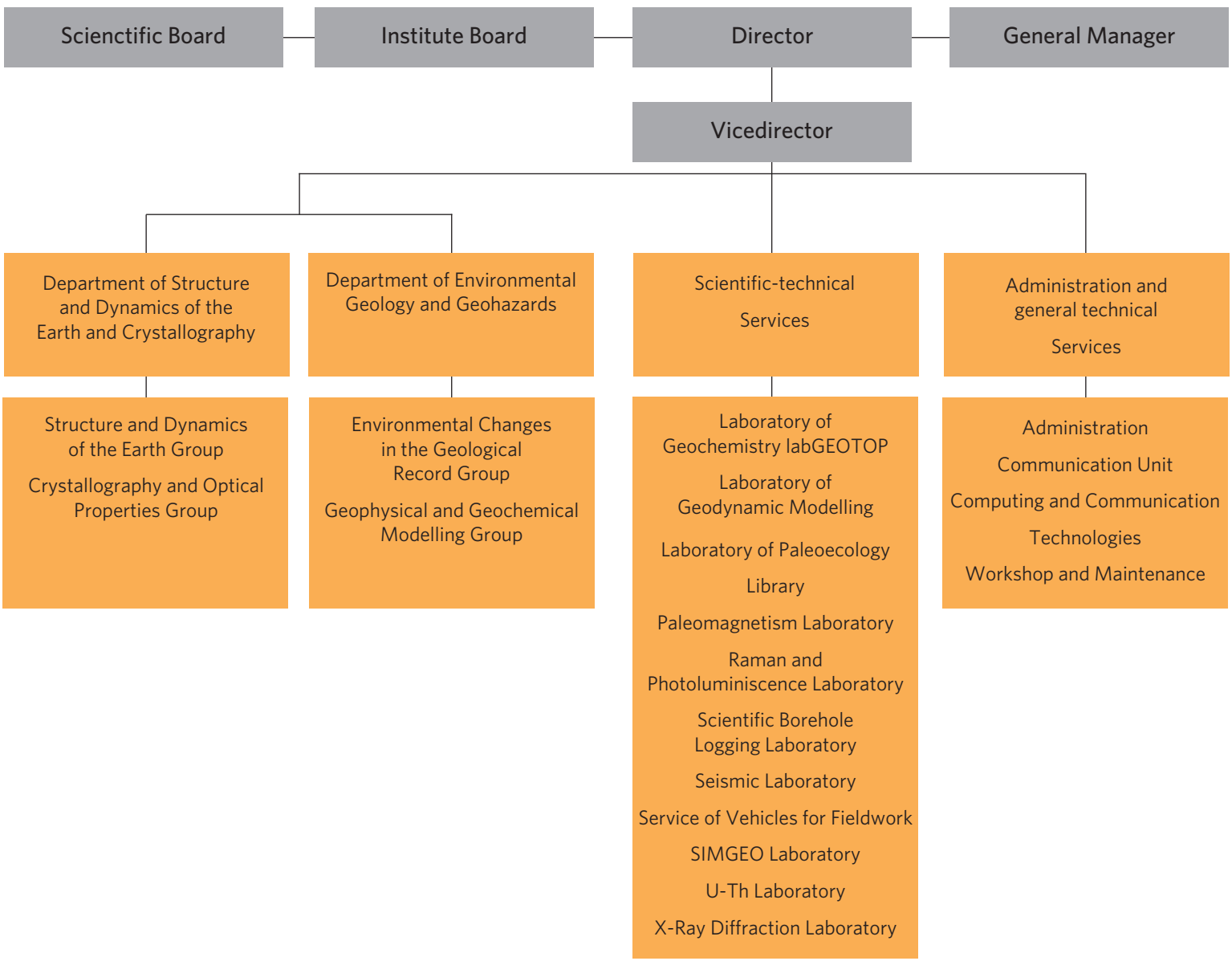
Our Aims

- Identify new and emerging, high-priority research opportunities.
- Enhance our training capabilities of the next generation of Earth scientists.
- Increase our support of early career researchers.
- Raise our level of international collaboration.
- Create and translate breakthroughs in knowledge-driven research into practical applications that provide the knowledge transfer that industry and society seeks.
- Advance knowledge and understanding within and across the different fields of Earth Sciences.

Our Expertise

- Geological and geophysical studies of the lithosphere and shallow subsurface.
- Characterization, quantification, monitoring, and forecasting of resources.
- Experimental and numerical modeling of geological, environmental and climate processes and hazards.
- Multidisciplinary analytical and experimental characterization of geological materials and processes.
- Technological development (instrumentation and software) applied to geophysical, geochemical and environmental monitoring, quality control, and quantitative assessment.

ORGANIZATION CHART



Foliated paragneiss with white fibrolite nodules. Sardinia, Italy. (Author: Lavinia Tunini)

A lonely portable drilling platform at Islas Cíes, Spain. (Author: Santiago Giralt)

Research Groups

RG

Taroko Folds, Taroko Gorge National Park, Taiwan. (Author: Cristina Biete)

RESEARCH GROUPS

The research groups of ICTJA-CSIC are organized in two departments:

The Department of Structure and dynamics of the Earth and crystallography consists of two research groups:

- Structure and dynamics of the Earth
- Crystallography and optical properties

Antonio Villaseñor
Department's Head

The Department of Environmental geology and geohazards is composed of two research groups:

- Environmental changes in the geological record
- Geophysical and geochemical modelling of geohazards processes and subsurface resources

María José Jurado
Department's Head

STRUCTURE AND DYNAMICS OF THE EARTH

Group members

Josep Gallart
Group Leader-Research Professor

Ramón Carbonell, Research Professor
Manuel Fernández, Research Professor
Joaquina Alvarez-Marrón, Senior Research Scientist
Dennis Brown, Senior Research Scientist
Jordi Díaz, Senior Research Scientist
Montserrat Torné, Senior Research Scientist
Jaume Vergés, Senior Research Scientist
Daniel García-Castellanos, Research Scientist
Ivone Jiménez-Munt, Research Scientist
Martin Schimmel, Research Scientist
Antonio Villaseñor, Research Scientist
Concepción Ayala, IGME Visiting Research Scientist
Jonas Ruh, SNSF, Switzerland, Visiting Research Scientist
Emilio Casciello, CSIC Contract Post-doc
Edouard Le Garzic, CSIC Contract Post-doc
David Martí, CSIC Contract Post-doc
Ignacio Marzán, CSIC Contract Post-doc
Massimiliano Melchiorre, CSIC Contract Post-doc
Eduard Saura, CSIC Contract Post-doc
Arantza Ugalde, CSIC Contract Post-doc
Lavinia Tunini, CSIC Contract Post-doc

Beatriz Gaite, CSIC Contract Post-doc
Chiara Macchiavelli, CSIC Contract Post-doc
Yohann Poprawski, CSIC Contract Post-doc
Elisenda Costa, CSIC Contract Post-doc
Sergi Ventosa, **Beatriu de Pinós** Post-Doc
Ylenia Almar, CSIC contract
Jorge Balsa, CSIC contract
Giulio Casini, CSIC contract
David Cruset, CSIC contract
Grant George Buffett, CSIC Contract
Clara Gómez, CSC contract
Mar Moragas, CSIC contract
Mireia Peral, CSIC contract
Juvenal Andrés Cabrera, FPI Pre-doc
Cristina Biete, FPI Pre-doc
Kittiphon Boonma, Marie Curie Pre-doc
Ajay Kumar, Marie Curie Pre-doc
María del Pilar Sánchez, FPI Pre-doc
Angel Valverde Pérez, FPI Pre-doc
Evelyn Núñez, Universidad Granada, Visiting PhD Student
Raquel Noriega, Visiting PhD Student

Research outline

The multidisciplinary research investigates the structure and dynamic processes of the Earth's interior. The main objective is to understand how the Earth works at different scales through the integration of a wide range of different datasets and methodologies, including Geophysics and Geology, Numerical Modelling, Geodesy, and Geochemistry.

The acquisition of high-resolution seismic, potential field data and surface geology is combined with numerical models to achieve an integrate approach to basic and applied research in Earth Sciences. Related projects to industry include applications for hydrocarbon exploration, waste disposal and geological storage of greenhouse gas emissions (CO_2).

Publications 2016

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Research projects 2016

National Funding Agencies

- *Project Title:* **MISTERIOS - Monitorización integrada del sistema tierra en España: red de investigación y observación sísmica**.
  Financed by: PNIDI-CGL - CGL2013-48601-C2-1-R
  Years: 2014-2017
  PI: Josep Gallart

- *Project Title:* **PROTAI/2 - Efectos de la arquitectura heredada del margen continental sobre la deformación y cinemática de cuñas orogénicas de colisión.arcocontinente**.
  Financed by: PNIDI-CGL - CGL2013-43877-P
  Years: 2014-2016
  PI: Joaquina Álvarez/Dennis Brown

- *Project Title:* **Red TOPOIBERIA – Red TOPO IBERIA-IberArray: estudios integrados de geodinámica y estructura de la placa ibérica**.
  Financed by: PNIDI-CGL2014-54582-REDC
  Years: 2014-2016
  PI: Josep Gallart

- *Project Title:* **MITE-Modelling the Iberian Topographic Evolution**.
  Financed by: PNIDI-CGL2014-59516-P
  Years: 2015-2017
  PI: Daniel García-Castellanos/Ivone Jiménez-Munt

- *Project Title:* **CIMDEF-El Sistema Central y los mecanismos de deformación de la Península Ibérica**.
  Financed by: PNIDI-CGL2014-56548-P
  Years: 2015-2017
  PI: Ramon Carbonell

International Funding Agencies

Project Title: **EPOS Implementation Phase — EPOS IP**
Financed by: European Commission, Directorate-General for Research & Innovation, Innovation Union and European Research Area, Research in frastructure (No. 676564, H2020-INFRA DEV-2014-2015/H2020-INFRADEV-1-2015-1)
Years: 2015-2019
PI: Massimo Cocco (INGV, Italy)

Industry collaboration

Project Title: **Geomargen III: adquisición, análisis e interpretación de datos sismológicos de la Cuenca de Tarfaya.**
Financed by: REPSOL
Years: 2014-2016
PI: Antonio Villaseñor

Project Title: **Regional structural sections across the Iraql Kurdistan.Study agreement FR00006948.**
Financed by: TOTAL
Years: 2014-2016
PI: Jaume Vergés

Snow hill painted in ash, Iceland. (Author: Daniel García-Castellanos)

Black Canyon, Gunisson National Park, Colorado, USA. (Author: Ramon Carbonell)

CRYSTALLOGRAPHY AND OPTICAL PROPERTIES

Group members

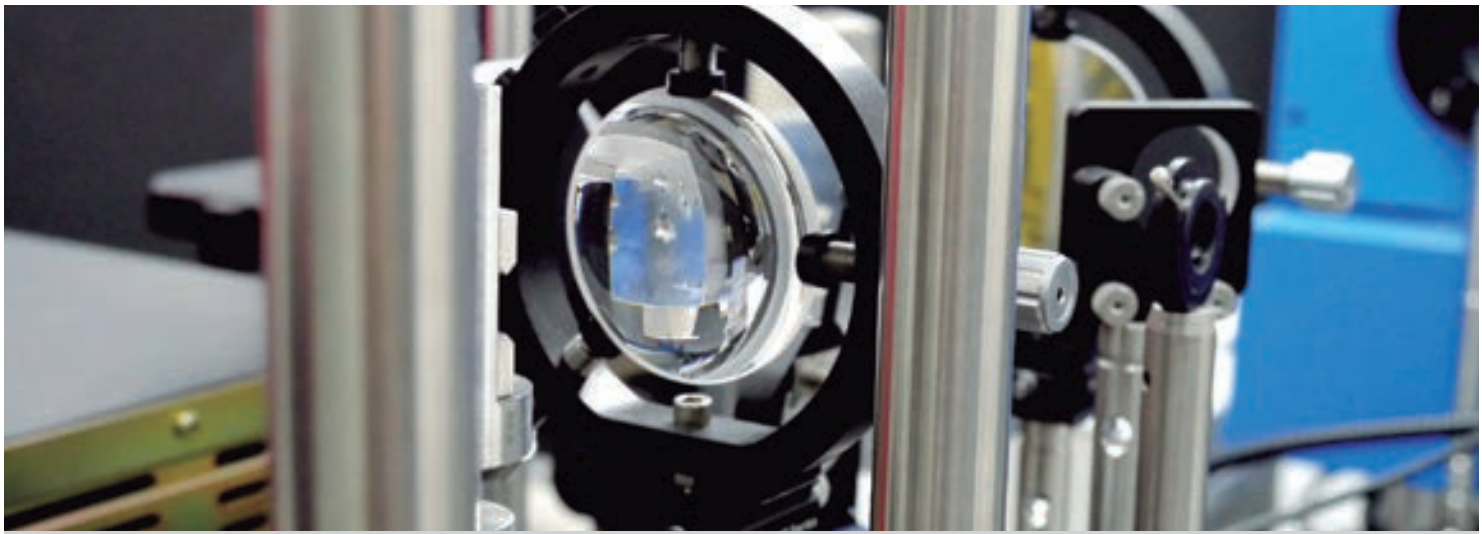
Lluís Artús
Group Leader-Senior Research Scientist

Ramon Cuscó, Research Scientist
Jordi Ibáñez, Research Scientist
Martí Busquets Masó, CSIC-Contract
Robert Oliva, FPI Pre-doc

Research outline

This line of research is focused on the study of the optical properties of semiconductor materials. Over the past few years we have carried out Raman scattering studies on a variety of III-V compound systems such as GaN, InN, InGaN, InAs/GaAs, InGaAs, InP, AlGaSb, InAsSb, GaSb, GaAsN, as well as on ZnO, a II-VI wide band gap material which is intensively being investigated because of its potential applications in transparent electronics and in blue and UV light emitters.

At present, an intensive research is being carried out by our group on the optical properties of the layered BN. Nowadays, the research on the physical properties of layered BN, with a honeycomb crystalline structure very similar to graphite, has aroused an important interest among the most relevant laboratories and leading research private companies because of their very interesting potential applications and the extreme significance that the layered compounds have reached during the last few years.



Raman spectroscopy and photoluminiscence laboratory. (Author: Jordi Cortés)

Publications 2016

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Research projects 2016

National Funding Agencies

- *Project Title:* MAPEE-Advanced materials for highly efficient energy processes: study of their optical properties
  Financed by: MINECO: MAT2015-71035-R
  Years: 2016-2018
  PI: Lluís Artús / Ramon Cuscó

- *Project Title:* Sistema de espectroradiometría de campo, vuelo y laboratorio
  Financed by: FEDER (CSIC15-EE-3303)
  Years: 2016-2017
  PI: Jordi Ibáñez

Travertines. Cuenca de Baza, Spain. (Author: Santiago Giralt)

ENVIRONMENTAL CHANGES IN THE GEOLOGICAL RECORD

Group members

José-Luis Fernández-Turiel
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Santiago Giralt, Research Scientist
Valentí Rull, Research Scientist
Rosa Utrilla, Research Scientist
Antonio Vázquez, Research Scientist
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Mari Carmen Trapote, Visiting PhD Student

Research outline

Our multidisciplinary group promotes the reconstruction of environmental, climate and ecological changes, their causes, and dynamic interactions through the multiproxy characterization of the geologic record. Throughout the history of our planet, the geological processes in general and climate and ecological change in particular have fingerprinted the sedimentary record. Furthermore, the increasing anthropogenic influence in the recent past is also readily identifiable in this geological record.

This research is carried out using a multiproxy approach and focuses on lake (and other sedimentary archives) sedimentology and global change, impact of geological, climatic and anthropogenic processes on the natural geochemical balances and biological responses, sedimentary processes and biomineralization, geochronological dating and physical and magnetic properties of the sediments as indicators of environmental and climatic processes, and biological remains (microfossils) preserved in the sediment as indicators of the ecological dynamics through time.

The objective of the research group is the robust and accurate reconstruction of past climate oscillations, environmental fluctuations and ecological dynamics as well as identify short, medium and long term trends of these changes through the multiproxy characterization of the geological sedimentary record. These reconstructions provide valuable data to put into a broad temporal perspective the current climate and environmental trends, as well as they provide useful insights about which has been the historical and current anthropogenic role in the recent evolution of the Earth and in shaping the current landscapes and ecosystems. These climatic, environmental and ecological reconstructions also provide data that allows the establishment of possible future climatic and environmental scenarios.

To achieve this goal the group is developing the following research lines:

- reconstruction of climatic, environmental and ecological changes using a high temporal resolution multiproxy approach of lacustrine sedimentary records;
- determining the geochemical impact of large-scale geological processes as explosive volcanic eruptions;
- studying the long-term trends of terrestrial plant communities' dynamics, the ecological and evolutionary origin and biogeography of present species, biomes and communities;
- assessment of relationships between processes and sedimentary environments and biomineralization, and-characterization of physical and magnetic properties of the sedimentary record as proxies of climatic and environmental events.

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Research projects 2016

National Funding Agencies

Project Title: PALEOMODES, Holocene climate and ecological impacts of the East Atlantic (EA) pattern and North Atlantic Oscillation (NAO) interplay in southwestern Atlantic Europe
Financed by: MINECO and FEDER
Years: 2016-2019
PI: Santiago Giralt

Project Title: BARCELONA ROCKS, una app para los que quieren aprender geología en su ciudad
Financed by: FECYT 2014 (FCT-14-8574)
Years: 2014-2016
PI: Lluís Cabrera Pérez, Universitat de Barcelona

Project Title: Paleoecología de alta resolución de los sedimentos varvados del Lago Montcortès durante los últimos 500 años: De la Pequeña Edad de Hielo al calentamiento Global
Financed by: PNIDI CGL - CGL2012-33665
Years: 2013-2016
PI: Teresa Vegas, Universitat de Barcelona

Project Title: NoBa - Estudio de la calidad físico-química y bacteriològica del agua subterrània y de red en centros urbanos y áreas rurales productives del noroeste de la provincia de Buenos Aires. Análisis de la distribución de arsénico y su comportamiento
Financed by: Ministerio de Educación y Deportes, Universidad Tecnológica Nacional, Argentina (INN3612)
Participant organizations: Facultad Regional Trenque Lauquen de la Universsidad Tecnológica Nacional (Argentina), Universidad Nacional de San Luis (Argentina, ICTJA-CSIC (España)
Years: 2015-2017
PI: Raúl Gil, Universidad Nacional de San Luis, Argentina

Project Title: Late Quaternary palaeoecology of Mauritia flexuosa L.f. (Arecaceae) wetland communities related to past climatic and human practices variability: evaluation for future climate projections and potential use for ecosystem services
Financed by: Agency for Management of University and Research Grants (AGAUR) - Marie Curie Cofund programme (2014 BP-B00094)
Years: 2015-2017
PI: Valentí Rull (tutor) & Encarni Montoya (fellow)

International Funding Agencies

Project Title: EPOS Implementation Phase — EPOS IP
Financed by: European Commission, Directorate-General for Research & Innovation, Innovation Union and European Research Area, Research in frastructure (No. 676564, H2020-INFRA DEV-2014-2015/H2020-INFRADEV-1-2015-1)
Years: 2015-2019
PI: Massimo Cocco (INGV, Italy)

View from the Vulcano crater, Vulcano Island, Italy. (Author: Lavinia Tunini)

GEOPHYSICAL AND GEOCHEMICAL MODELLING

Group members

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Helena Gallardo, Visiting PhD Student

Research outline

Geological, geochemical and geophysical studies are applied to model natural processes that can become geological hazards. These studies include research topics related to volcanism, seismology, landslides or geochemical transfer in subsurface and surface land. From a multidisciplinary point of view, the research is focused on the physics of hazardous geological processes, development of analytical methods for geochemistry, borehole geophysics and remote sensing.

Among the most important used techniques we highlight:

- Simulation of geological processes using a combination of numerical and experimental methods
- Application of X-ray radiation for the study of materials and residual waters
- Borehole geophysics and subsurface imaging

Publications 2016

- Albert, H., F. Costa, and J. Martí (2016), Years to weeks of seismic unrest and magmatic intrusions precede monogenetic eruptions, *Geology*, doi: 10.1130/g37239.1.
- Bartolini, S., R. Sobradelo, and J. Martí (2016), ST-HASSET for volcanic hazard assessment: A Python tool for evaluating the evolution of unrest indicators, *Computers and Geosciences, 93*, 77-87, doi: 10.1016/j.cageo.2016.05.002.
- Becerril, L., J. P. Galve, J. M. Morales, C. Romero, N. Sánchez, J. Martí, and I. Galindo (2016a), Volcano-structure of El Hierro (Canary Islands), *Journal of Maps, 12*, 43-52, doi: 10.1080/17445647.2016.1157767.

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Research projects 2016

National Funding Agencies

- *Project Title:* EXCAVA-Explora, caracteriza y visualiza
  Financed by: PNIDI-IPT – 2012-0979-380000
  Years: 2013-2016
  PI: María José Jurado

- *Project Title:* POSVOLDEC, Understanding post-caldera volcanic processes in Deception Island (Antartica): Implications for assessing future potential volcanic hazards
  Financed by: MINECO and FEDER
  Years: 2016-2019
  PI: Adelina Geyer

International Funding Agencies

- *Project Title:* VeTools Development and implementation of e-Tools for Volcanic Hazard Assesment and risk management
  Financed by: DG ECHO H2020 Ref. SI2.695524 (European Comission)
  Years: 2015-2016
  PI: Joan Martí

- *Project Title:* EPOS Implementation Phase — EPOS IP
  Financed by: European Commission, Directorate-General for Research & Innovation, Innovation Union and European Research Area, Research infrastructure (No. 676564, H2020-INFRA DEV-2014-2015/H2020-INFRADEV-1-2015-1)
  Years: 2015-2019
  PI: Massimo Cocco (INGV, Italy)

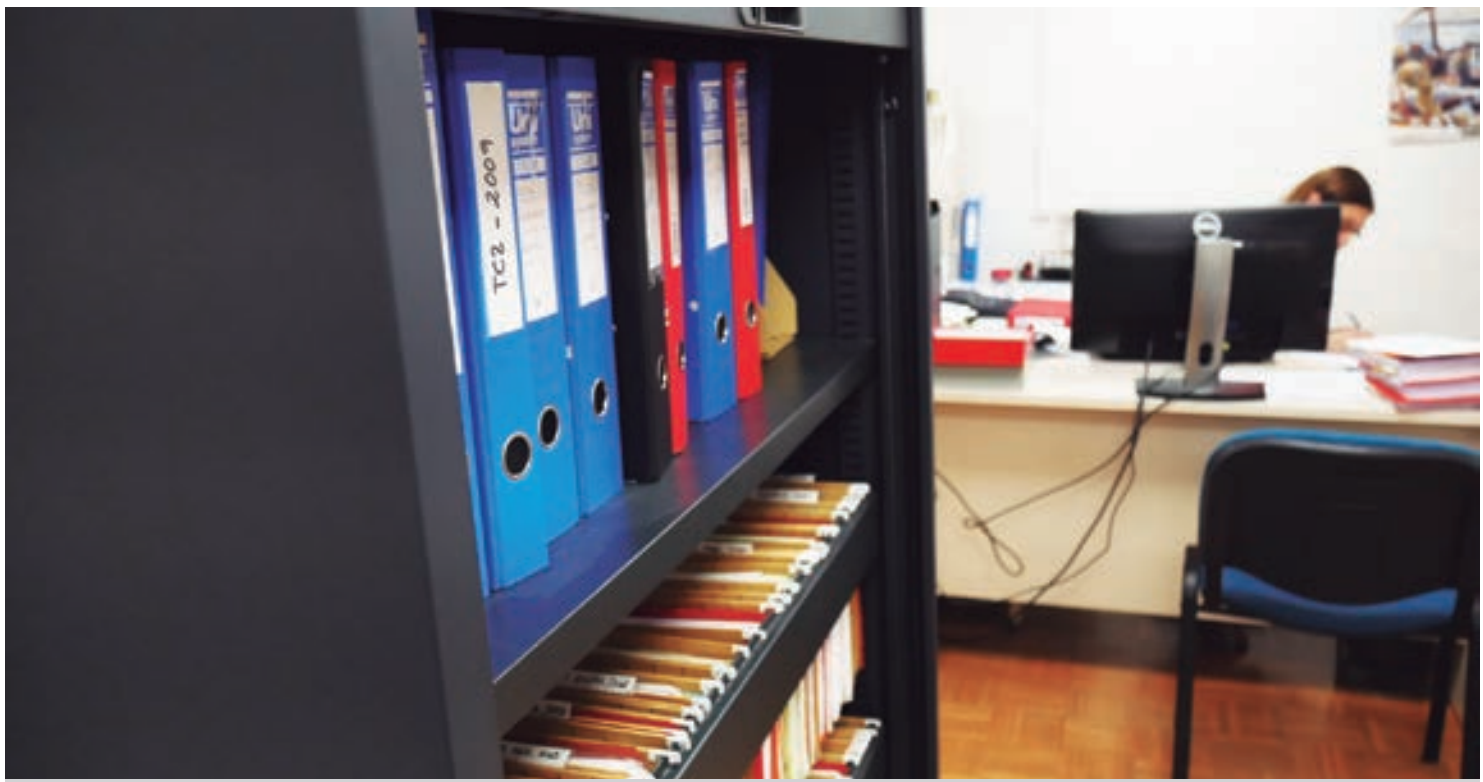
GENERAL SERVICES

Management and General Services

The Management and General Services depend directly on the Institute's Manager and include the administration of:

- Human resources. Management of permanent staff, contract personnel and trainees, taking up their posts, contracts, grants, end of contract, reporting joiners and leavers to the Social Security system, etc.
- Project management. This includes applying for monitoring and financial management of national and international projects (public and industrial).
- Purchasing and procurement of supplies, service and maintenance – buildings, special infrastructures, technical services, vehicles.
- Management of travel and subsistence expenses.

The General Services are also responsible for maintenance of electrical and mechanical installations and devices, porter, mailing, and cleaning.



Administration office. (Author: Jordi Cortés)

Manager

José Luis López Burguillo

Maintenance

Óscar Ávila, *Technical staff*

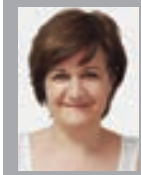
Miquel Àngel González, *Technical staff*

Jordi Mora, *Technical staff*

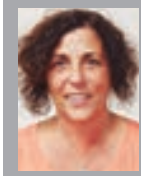
Administrative support

Leonor Fernández, *Purchasing and procurement*

Núria Gasull, *Payer*



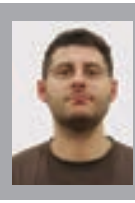
María Consuelo Palacio, *Human Resources*



Esmeralda Rodríguez, *Project management*

Front desk

Xavier Pascual, *Receptionist*



Alejandro Tatevosian, *Receptionist*

Computing and Communications Service

Marc Español, *Technical contract*

Oscar Frías, *Technical staff*

The main objective of this service is to facilitate the communication and computing tools and basic and advanced services to allow researchers of ICTJA to achieve their scientific objectives.

The unit manages a network infrastructure compose of about 150 medium size computers, a Wi-Fi spread throughout the building, some server-oriented computing, storage and connectivity with the Scientific Ring/RedIris/Geant2.

ICTJA facilitates the access to 5 CSIC research institutes (CID, IBB, CEAB, IBMB and IIBB) to this Scientific Ring.

Communication Unit

Jordi Cortés, *CSIC contract*

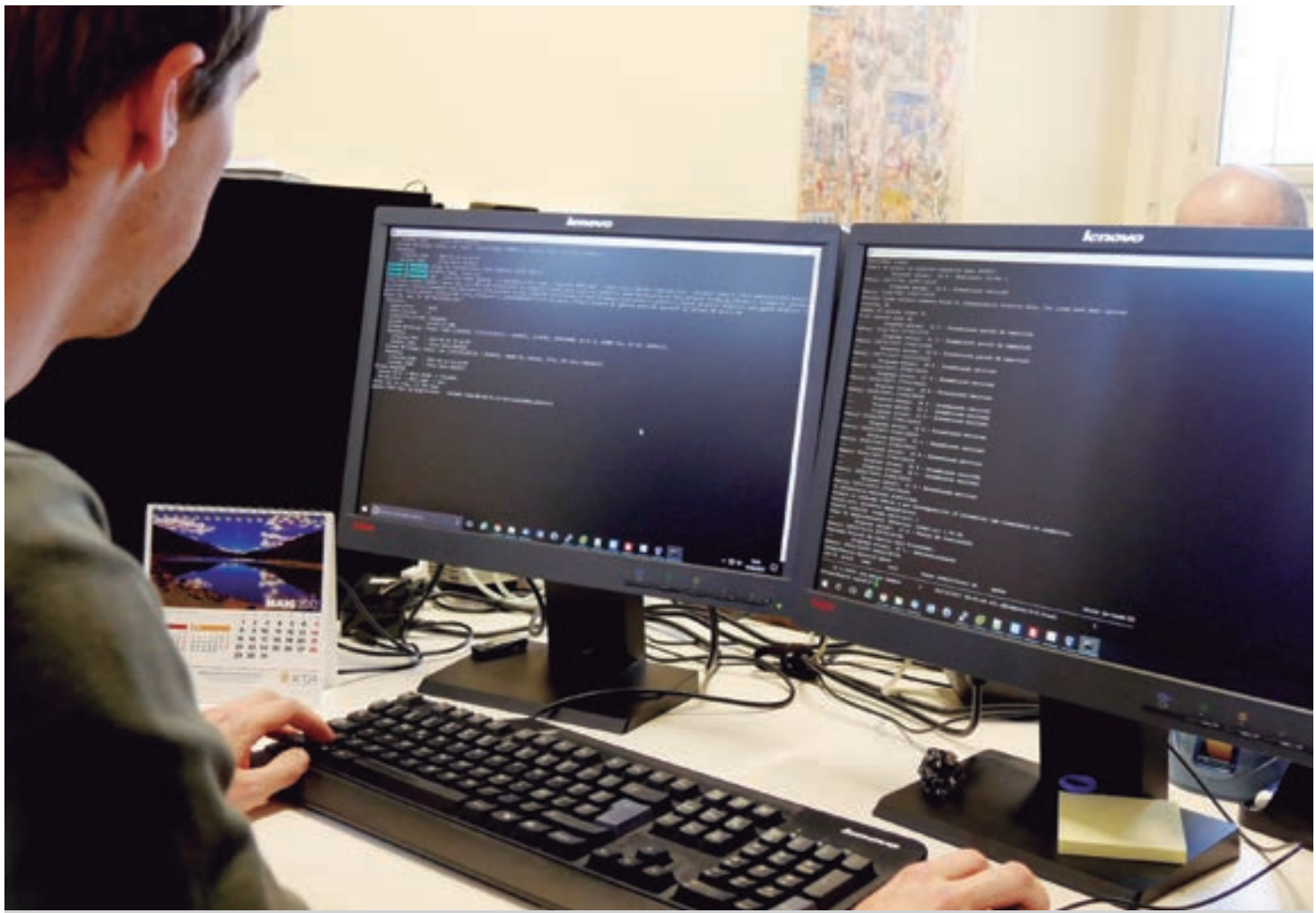
As a reference research centre on Earth Sciences, ICTJA-CSIC has decided to take an active role in the social dissemination of Earth Sciences knowledge. Therefore, the institute created the Communication Unit, which was established in November 2015 as a result of the kick-off of the COMUNICA project. This project is aimed to increase the social visibility of the ICTJA-CSIC research.

The main goals of Communication Unit are:

- Increase external visibility of ICTJA-CSIC
- Disseminate information about research activities
- Design and implement appropriate communication strategies
- Strengthen staff links and engagement
- Promote social knowledge of Earth Sciences

Here we present some examples of Communication Unit activity in 2016:

- Mantainance of the media database
- Creation and upgrade content for digital media (web and social networks institutional accounts)
- Dissemination of ICTJA-CSIC research activity through press-releases
- Creation of the ICTJA-CSIC internal Newsletter
- Assistance to the ICTJA staff members in their outreach activities
- Production of audio-visual content: EGU 2016 contest video winner & promotional videos for INSPIRACIÈNCIA contest
- Design of marketing products: leaflets, trifolds, posters related with the institute, its services and courses
- Design and production of Institutional communication products: *2015 Anual Report and ICTJA-CSIC New Employee Booklet*



Computing and communications service. (Author: Jordi Cortés)

SCIENTIFIC SERVICES AND LABORATORIES

Library

The Library of Earth Sciences (UB-CSIC), housed in the Faculty of Earth Sciences, is jointly managed by the Faculty of Earth Sciences of the University of Barcelona (UB) and the Institute of Earth Sciences Jaume Almera (ICTJA-CSIC). This library is one of the most important geology libraries in Spain in terms of repository of journals and books and quality of service. In addition, major bibliographic databases are also offered (WOS, SCOPUS, GEOREF, PASCAL, CINDOC, and BIGPI). The library is currently compiling a database on Bibliography of Earth Sciences of the Iberian Peninsula (BIGPI) including more than 40,000 records of articles, lectures, books, theses, etc. on any aspect of the geology of the Iberian Peninsula

A map of the collection of the Library of Earth Sciences Faculty (UB-CSIC). (Author: Jordi Cortés)

THE LIBRARY IN NUMBERS

18.000
books and subscription to thousands of e-books

1.054
printed journals and subscription to thousands of e-journals

10.000
maps (geological, topographic, etc.)

14.000
aerial photographs

8.000
article reprints of the geology of the Iberian Peninsula

350
PhD Thesis

GEOLOGICA ACTA

The publication of the journal Geological Acta is also managed through this service. It is an international journal of Earth Sciences providing an innovative and high quality media of scientific dissemination. Geologica Acta aims to stimulate rapid diffusion of results and efficient exchange of ideas among the widespread communities of Earth Sciences researchers (with special emphasis on Latin-American, the Caribbean, Europe, and the Mediterranean regions). The Journal is edited in collaboration with the University of Barcelona and the IDAEA-CSIC institute. Since 2007, Geologica Acta is included in the Journal Citation Report of ISI Thomson withan Impact Factor (IF) of 1.056 in 2015 and a 5 year IF of 1.476.

Staff

Dolors Fernández, *Librarian*

Jordi Casadellà Saladas, *Chief Librarian*
Victor Sastre Jané, *Librarian*
Daniel Casanueva González, *Librarian*
Emma Dalmau Ollé, *Librarian*
María José Martínez López, *Librarian*
Adelina Ito Carol, *Librarian*
Laura Rincón, *Geologica Acta, Journal Manager*

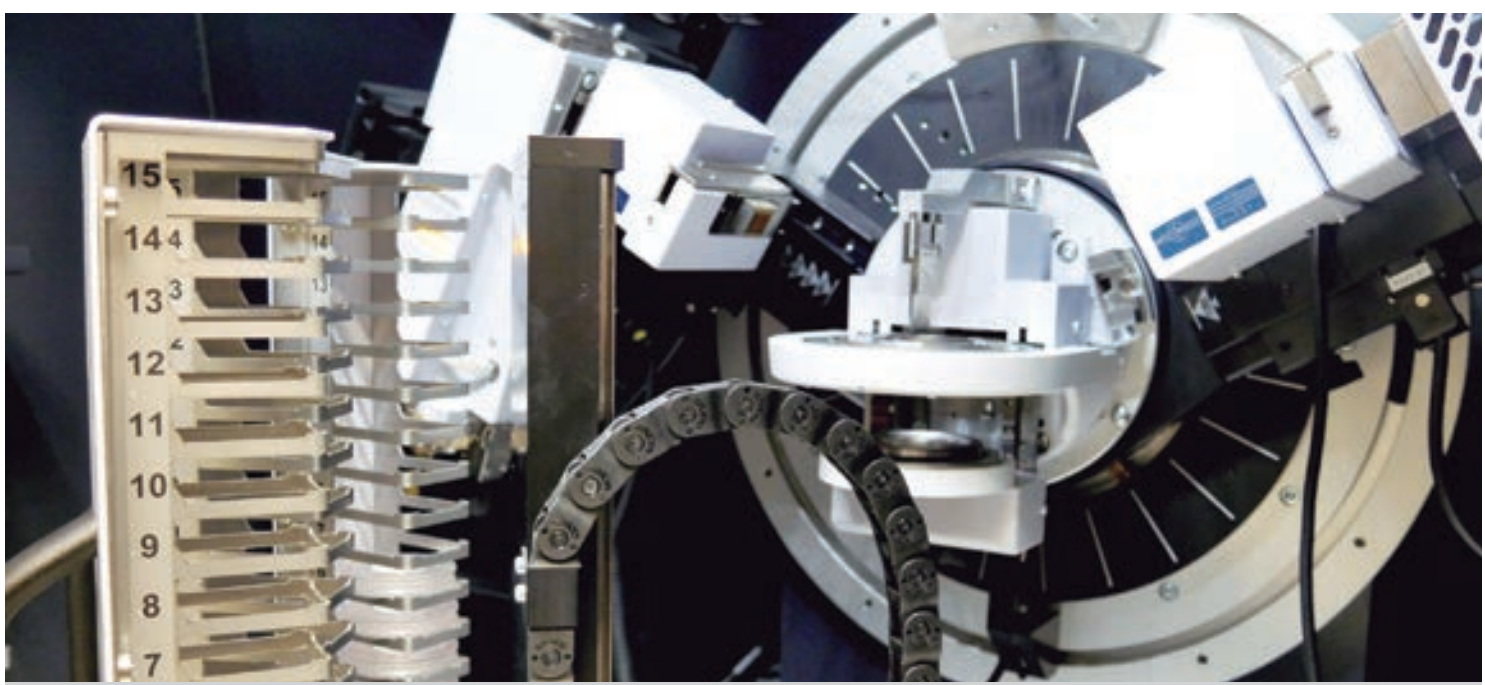
X-Ray Diffraction Service

The X-ray Diffraction Service of ICTJA-CSIC is an analytical facility focused on the qualitative and quantitative characterization of the crystalline phases of materials. The XRD Service, with more than 30 years of experience in the field, offers support to ICTJA researchers and to external users from public and private universities and companies.

One of the main objectives of the XRD Service at ICTJA is to support the ongoing investigations carried out by ICTJA researchers on Earth Sciences topics, including studies of volcanology, petrology and sedimentology. The XRD Service offers also support to external researchers working in geology, materials science, environment, chemistry, pharmacy, archaeology, etc. A large number of companies and organizations from the public or private sectors make use of the XRD Service at ICTJA for their industrial applications, quality control, environmental studies, forensics, etc.

Range of services offered

- Identification of crystalline phases
- Crystal-quality assessment, composition determination and microstructural analyses
- Semi-quantitative and quantitative analysis of crystalline phases and amorphous content
- Application of the Rietveld method for profile adjustment, structure refinement and quantitative phase analyses
- Investigation of small or inhomogeneous samples with micro-diffraction
- Determination of crystalline structures
- Non- destructive X-ray fluorescence analyses with a portable spectrometer for field work and cultural heritage studies



Detailed view of the X-Ray diffractometer. (Author: Jordi Cortés)

Some examples of applications provided by the laboratory to research groups and companies

- Phase identification and quantification of geological samples. Identification and analysis of clay minerals
- Analysis of mineral phases in building materials: cement, concrete, aggregates, etc. Study of degraded calcium aluminate cements, identification of fibre cements, etc.
- Determination of the amorphous content in ashes and synthetic mixtures
- Study of corrosion products
- Determination of crystalline silica in respirable airborne dusts by direct-on-filter methods

The XRD Service is part of the European initiative EPOS-IP infrastructure and multidisciplinary global research in Earth Sciences (https://www.epos-ip.org/). It integrates several hundred national infrastructures distributed in 25 countries in Europe, including Spain, for observation and measurement of the internal structure and dynamics of the planet. The XRD Service participates collecting and harmonizing available and emerging laboratory data, coordinating the development, integration and transnational use of the main Solid Earth Science lab centres and networks, and providing products and services supporting research into geo-resources and geo-storage, geo-hazards and Earth System Evolution.

Staff

Jordi Ibáñez,
Scientific Director

Josep Elvira,
Technical Director

María Soledad Álvarez,
Technical Staff

X-Ray Diffraction Service staff working. (Author: Jordi Cortés)

Some samples waiting to be studied at the Paleomagnetism Laboratory. (Author: Jordi Cortés)

Paleomagnetism Service (CSIC-CCiTUB)

The Paleomagnetic Laboratory was founded in 1987 as result of an agreement between the CSIC and the Catalonian Geological Service of the Generalitat de Catalunya. Since 1999, the laboratory depends on the CCiTUB and the CSIC.

The laboratory provides technical support to research groups working on several research topics within the Earth Sciences, among them:

- Magnetostratigraphic dating of sedimentary sequences and correlation with their fossil and paleoenvironmental record.
- Archaeomagnetic dating of archaeological remains.
- Paleomagnetism applied to the study of fold and thrust belts and basin analysis.
- Environmental magnetic studies aimed to unravelling paleoenvironmental and climatic variations in the sedimentary record.

The laboratory facilities include a superconducting and a spinner magnetometers, 3 thermal demagnetizers, 2 AF demagnetizers, a susceptibility bridge and an impulse magnetizer.
The Paleomagnetism Service is part of the European initiative EPOS-IP infrastructure and multidisciplinary global research in Earth Sciences (https://www.epos-ip.org/). EPOS integrates several hundred national infrastructures distributed in 25 countries in Europe, including Spain, for observation and measurement of the internal structure and dynamics of the planet. The Paleomagnetism Service participates collecting and harmonizing available and emerging laboratory data, coordinating the development, integration and transnational use of the main Solid Earth Science lab centres and networks, and providing products and services supporting research into geo-resources and geo-storage, geo-hazards and Earth System Evolution.

Paleomagnetism Laboratory staff recollecting samples.
(Author: Elisabet Beamud)

Staff

Elisabet Beamud,
Technical Director

Santiago Giralt,
Research Scientist

Juan Cruz Larrasoaña,
IGME Visiting Research Scientist

Mireia Barrachina,
CSIC contract

Luis Valero,
CSIC contract

labGEOTOP Service - Geochemistry Laboratory

The labGEOTOP Service, Laboratory of Elemental and Isotopic Geochemistry for Petrological Applications, carries out multidisciplinary research in Solid Earth Sciences using an established core of world class equipment and laboratories, and expertise in the technical and applied aspects of their use. The service plays a key role in catalysing leading edge cross-disciplinary research within the CSIC and into Spain.

The labGEOTOP service provides a central mass of equipment that enables significant scientific collaboration on a regional, national and international scale. We undertake a wide variety of analytical work for scientific institutions and industry. The labGEOTOP offers elemental and isotopic analysis of solids and liquids covering the range of elements determined by high resolution-inductively coupled plasma-mass spectrometry.

The service focuses on the analytical needs of R&D projects on:

- Compositional structure and evolution of Earth's mantle: mantle geochemistry mainly through the open window of the volcanic rocks; origin of mantle plumes.
- Compositional structure and evolution of the lithosphere: geochemical processes at the margins of tectonic plates.
- Geochemical evolution of magmatic and metamorphic processes.
- Environmental geology and paleoclimate reconstruction.
- Volcanism: temporal evolution of pre- and syn-eruptive magmatic processes: geochemical flows related to volcanic activity.
- Experimental petrology and mineralogy.

Working with the laser ablation equipment of the labGEOTOP. (Author: Jordi Cortés)

Working with the laser ablation equipment of the labGEOTOP. (Author: Jordi Cortés)

Facilities of the Service:

High Resolution Mass Spectrometer (HR-ICP-MS), Thermo Scientific Element XR.
Laser Ablation Microprobe, New Wave Research UP-193 Excimer Laser Ablation System.
Sample preparation facilities for crushing (jaw crusher, rock saws, tungsten carbide percussion mortars), powdering (ring mill with agatha and tungsten carbide containers), drying (ovens), and separating (binocular picking microscopes, sieves, balances, Franz magnetic separator, heavy liquids) geological samples. Supporting sample preparation laboratories house two special perchloric acid fume hoods, two evapoclean systems, high-temperature muffle furnaces for loss on ignition (LOI) determinations, and a Millipore water purification system (Elix + MilliQ Advantage A10 + QPod Element Merck Millipore).

The labGEOTOP is a Project cofounded by ERDF through the Scientific and Technological Infrastructure National Program in the National Plan for Scientific Research, Development and Technological Innovation (R&D) of the Ministry of Science and Innovation, Reference CSIC08-4E-001.

The labGEOTOP Service is part of the European initiative EPOS-IP infrastructure and multidisciplinary global research in Earth Sciences (https://www.epos-ip.org/). It integrates several hundred national infrastructures distributed in 25 countries in Europe, including Spain, for observation and measurement of the internal structure and dynamics of the planet. The labGEOTOP participates collecting and harmonizing available and emerging laboratory data, coordinating the development, integration and transnational use of the main Solid Earth Science lab centres and networks, and providing products and services supporting research into geo-resources and geo-storage, geo-hazards and Earth System Evolution.

Staff

José-Luis Fernández-Turiel,
Scientific Director

Marta Rejas,
Technical Director

Luis Enrique Pezantes,
CSIC contract

Seismic Laboratory staff deploying seismic stations. (Author: Jordi Cortés)

Seismic Laboratory (LabSis)

ICTJA Seismic Laboratory is composed by two main sections, the Mobile Seismic Pool and the Seismic Processing Centre.

The Mobile Seismic Pool includes seismic equipment intended to be used in temporary deployments, from short-term controlled source seismic profiling to long-term passive seismic deployments. The pool includes three branches; the broad-band branch is composed by 90 dataloggers equipped with Nanometrics T120 and TC sensors, 38 of them being part of the TopoIberia pool. The short-period branch offers up to 38 stations with robust, easy-to-install 2 Hz seismometers. Finally, the high resolution pool is composed by 250 nodes with 10 Hz geophones.

The Seismic Processing Centre includes up to 8 servers devoted to calculus, management of storage systems, data distribution, near real- time data acquisition and databases/web integration. Linux workstations, up to 218 Tb of disk space and dedicated processing software are available in the facility. The Centre is able to receive and store in near-real time seismic data from temporary seismic stations and selected permanent sites. The geoDB database, a repository offering free access to a significant amount of active source seismic data is hosted in the facility. Finally, the Seismic Processing Center features connectivity with the Barcelona Supercomputing Centre and has research relationships with other computation, processing, interpretation and modelling facilities such as GEO-MODELS (University of Barcelona) and the Barcelona Centre for Subsurface Imaging.

The Seismic Laboratory is part of the European Research Infrastructure on Solid Earth EPOS-IP (https://www.epos-ip.org/). This initiative is a long-term plan to facilitate integrated use of data, data products, and facilities from distributed research infrastructures for solid Earth science in Europe and involves several hundred national infrastructures distributed in 25 countries in Europe.

Seismic Laboratory staff testing seismic stations. (Author: Jordi Cortés)

Staff

Jordi Díaz Cusí, *Scientific Director*

Ramón Carbonell, *Research Scientist*

Josep Gallart, *Research Scientist*

Martín Schimmel, *Research Scientist*

Antonio Villaseñor, *Research Scientist*

Mario Ruíz, *Technical Director*

Paula Romero, *CSIC contract*

Raman Spectroscopy and Photoluminescence Laboratory

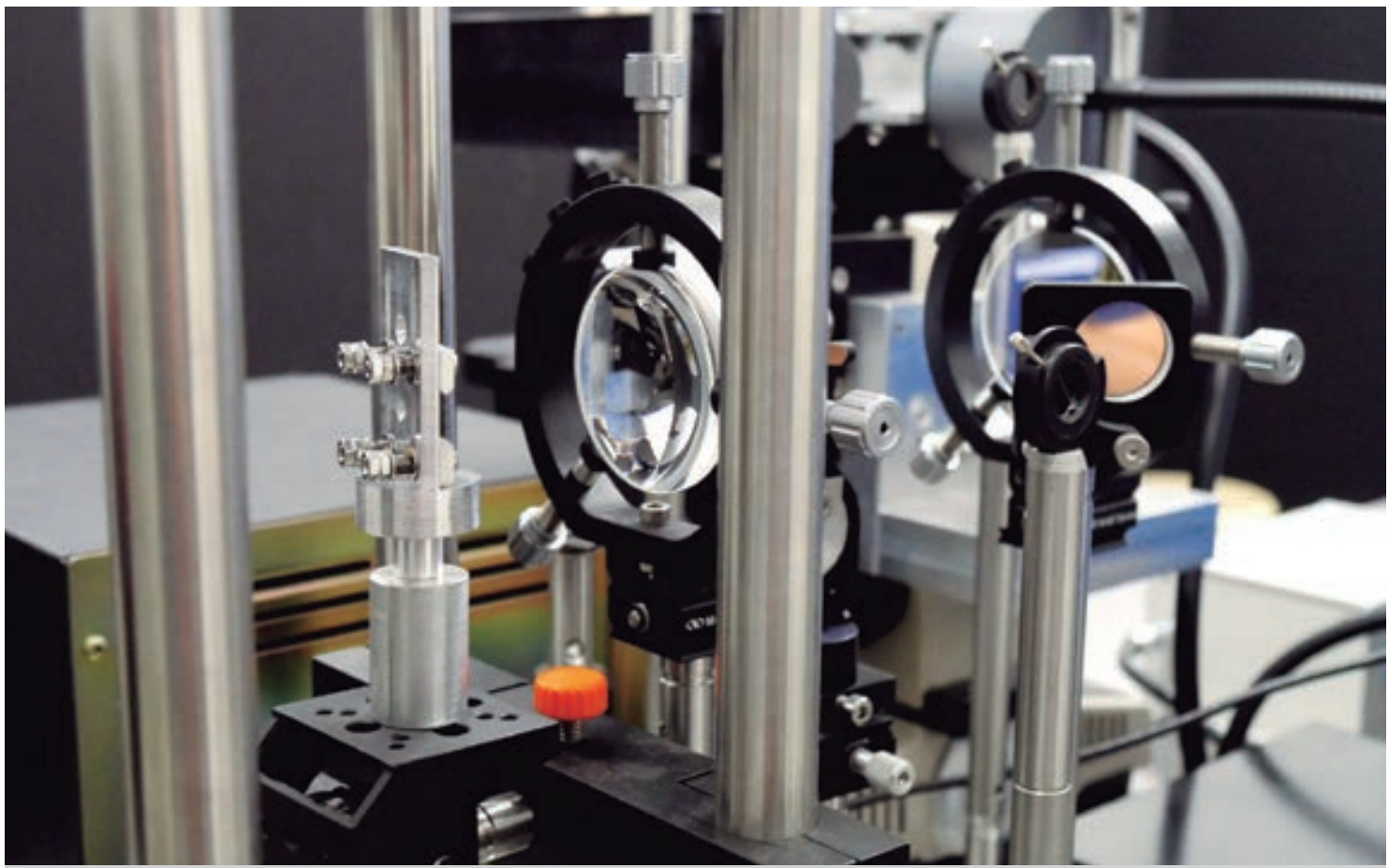
The Laboratory of Raman Spectrocopy and Photoluminescence is focused on the study of the optical properties of semiconductor materials. Among others, the lab carries out Raman scattering studies on a variety of III-V compound systems such as GaN, InN, InGaN, InAs/GaAs, InGaAs, InP, AlGaSb, InAsSb, GaSb, GaAsN, as well as on ZnO, a II-VI wide band gap material which is intensively being investigated because of its potential applications in transparent electronics and in blue and UV light emitters.

Staff

Lluís Artús,
Scientific Director

Ramon Cuscó,
Research Scientist

Jordi Ibáñez,
Research Scientist



Raman spectroscopy and photoluminiscence laboratory. (Author: Jordi Cortés)

Th-230/U-234 Geochronology Laboratory

The Laboratory of Geochronology was founded in 1989 and fully updated in 2010 with the acquisition of two 8-channel ORTEC alpha spectrometers. The laboratory is specially designed for dating marine and continental carbonates such as travertines, speleothems, endogenic lacustrine carbonates, corals and marine crusts, although it is possible to date primary sulphates (gypsum) and chlorides (halite) using the uranium series disequilibrium method (230Th/234U).

The laboratory provides technical support for research groups working on:

- Absolute dating of upper Pleistocene and Holocene continental and marine carbonate samples for a large variety of purposes such as climate, anthropic, geologic and/or environmental reconstructions.
- Absolute dating of human and other archaeological carbonate prehistorical ramains.

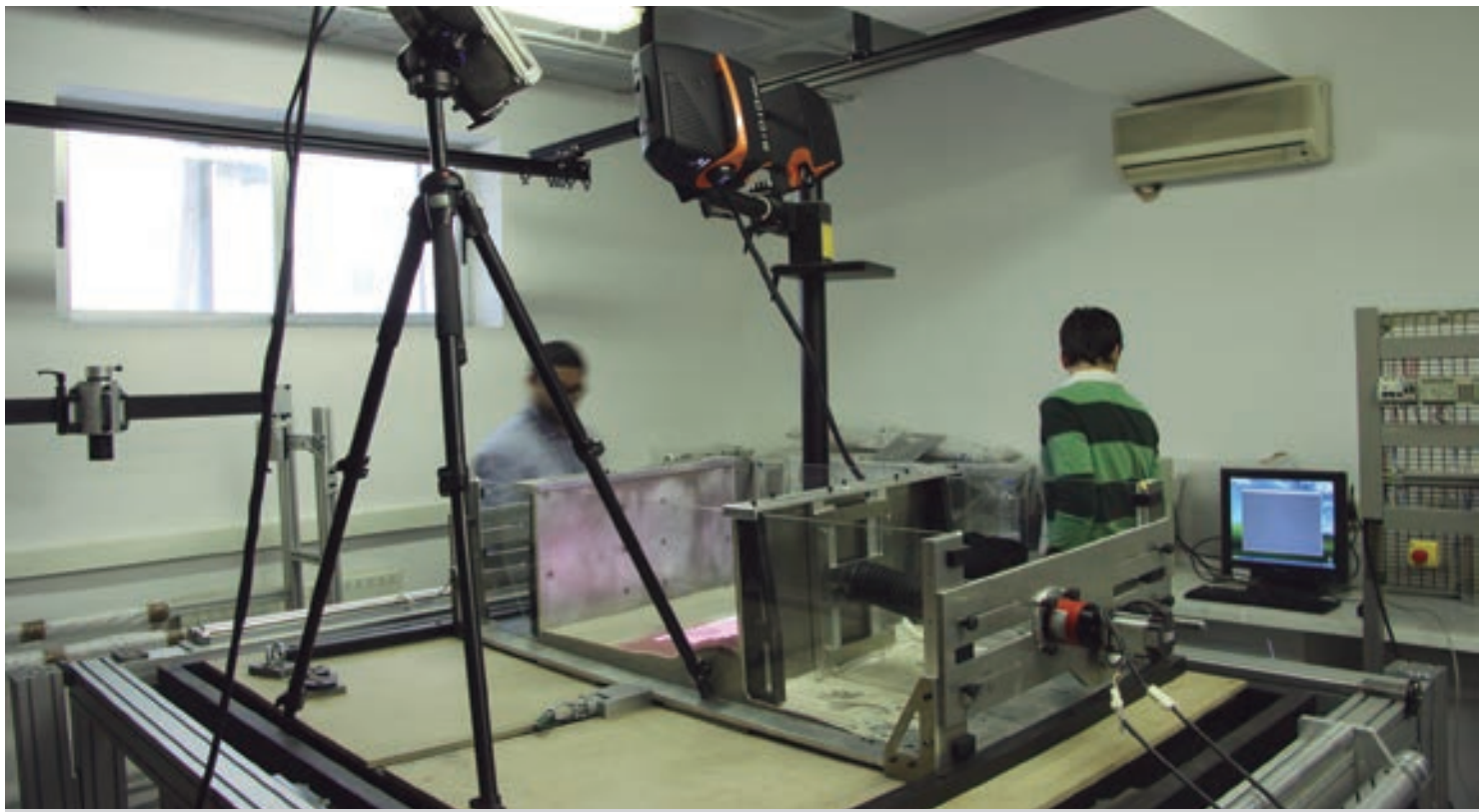
Staff

Santiago Giralt,
Scientific Director

Graciela Monzón,
Technical Director

Laboratory of Geochronology staff. (Author: Jordi Cortés)

SIMGEO (UB-CSIC)



SIMGEO facilities. (Author: Joan Martí)

The Laboratory of Geological Processes Simulation (SIMGEO) was created in 1995 as a joint venture between the Faculty of Geology of the University of Barcelona (UB) and the Institute of Earth Sciences Jaume Almera (ICTJA-CSIC) in the field of experimental and theoretical modelling of geological processes.

SIMGEO seeks to promote application of experimental and theoretical models to the study of geological processes and, in particular, processes that involve a risk to people and the environment, through funding raised by public and private research projects and contracts and agreements.

SIMGEO offers researchers a large space and equipment to design and develop experimental models.

Staff

Joan Martí, *Scientific co-Director*

Ferran Colombo, *Scientific co-Director UB*

Borehole Geophysical Logging Lab - Scientific Boreholes Almera 1-2

Two scientific boreholes were drilled in 2012 in the UB campus of Barcelona as part of the subsurface research studies of the Institute of Earth Sciences Jaume Almera (ICTJA) in cooperation with the Faculty of Geology of the University of Barcelona (UB).

The Almera-1 is a 214.20 m deep borehole used as an experimental facility for the development of geophysical data logging methods. The borehole Almera-2 is 1 m away from Almera-1, reaching a depth of 46 m, and is meant to carry out routine piezometric measurements and cross hole experiments.

A subsurface connection for cables and tools with the borehole and monitoring research lab inside ICTJA building facilitate long term and continuous monitoring and control from the lab. This facility is equipped with a complete system of geophysical logging tools and borehole monitoring data loggers used for testing of new devices and experiments in the frame of ongoing research projects.

Staff

M. José Jurado, *Scientific Director*

José Crespo, *CSIC contract*

Testing geophysical logging tools in the scientific borehole Almera-1. (Author: Jordi Cortés)

Laboratory of Palaeoecology (PALAB)

PALAB analyzes biological proxies with applications on Quaternary paleoecology and paleoclimatology, radiocarbon dating, archeology and biostratigraphy. The service is open to any universities, institutes, research groups, individual researchers and private and public companies. We work on a wide range of paleoarchives including lake sediments, peat bogs and similars, moden samples (including mosses), archeological sites, caves, middens, etc. PALAB has been inaugurated in 2016 and includes new state-of-the art facilities. During this year, we have worked with sedimentary archives of a wide range of environments, including remote locations such as the Orinoco Delta (Venezuela) and Easter Island.

Services provided

- Raw sample preparation (chemical treatment)
- Pollen analysis at three levels (basic, detailed and specialized)
- Non-pollen palynomorphs (NPP) analysis
- Macrocharcoal and microcharcoal analysis
- Graphical representation and interpretation
- Technical reports

Staff

Valentí Rull, *Scientific Director*

Encarni Montoya, *Beatriu de Pinós, Marie Curie COFUND Research Fellow*

Laboratory of Palaeoecology staff member preparing samples. (Author: Jordi Cortés)

Laboratory of Geodynamic Modelling

The Laboratory of Geodynamic Modelling is the result of a group of geophysicists and geologists nucleated in 1998 at the Institute of Earth Sciences linked by the interest on lithospheric-scale processes and their interaction with the processes occurring on the Earth's surface. The Laboratory of Geodynamic Modelling, established in 2016, offers the experience on several codes and on the numerical modeling techniques. It is equipped with a cluster (EARTH) and a workstation (MITE) with 120 and 64 processors, respectively. The Laboratory is also connected with the Barcelona Supercomputing Center.

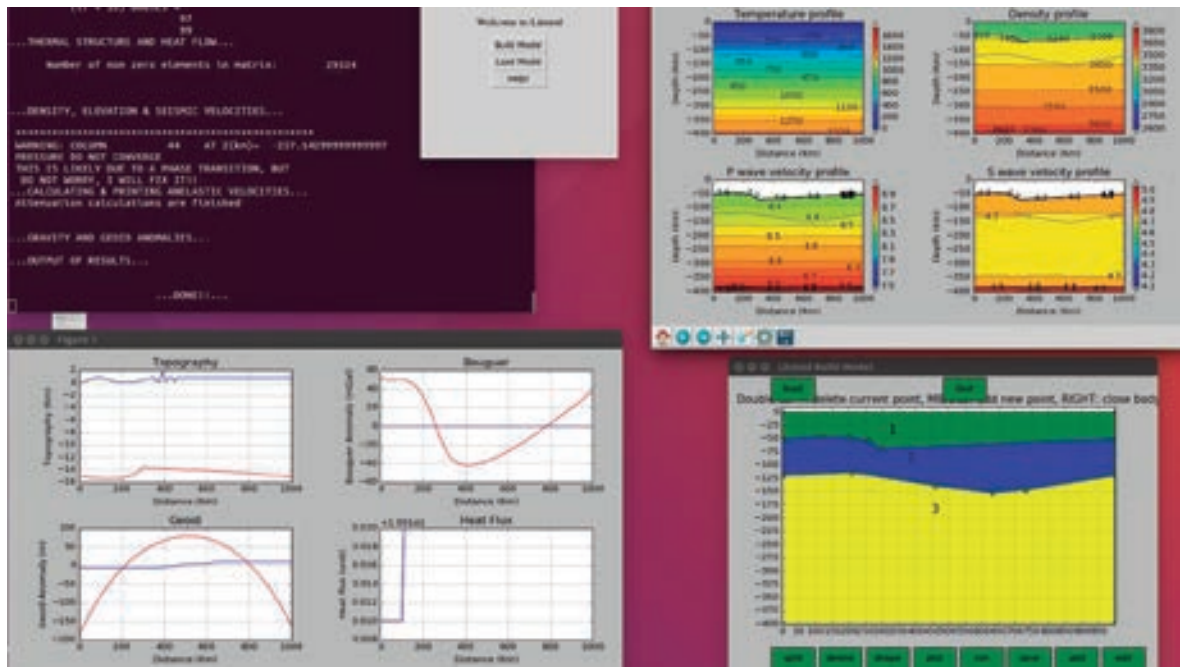
The services offered by the Laboratory are:

- High performance computing applied to geodynamic processes.
- Know-how in the study the lithosphere and upper mantle structure,and the geodynamic processes that take place on the lithosphere-uppermantle linked with the surface.
- The Laboratory of Geodynamic Modelling has a group of softwa developed within the group during the last 20 years:
  - TISC.
  - tAo.
  - LITMOD2D and LITMOD3D
  - CAGES
- Expertise in using other geodynamic academic tools:
  - Underworld.
  - I3ELVIS
- Experience in developing scientific numerical codes

Staff

Daniel García Castellanos, *Scientific Director*

Ivone Jiménez, *Scientific Director*



Eruptive column, Stromboli Island, Italy. (Author: Laura Becerril)

10 highlighted publications 2016

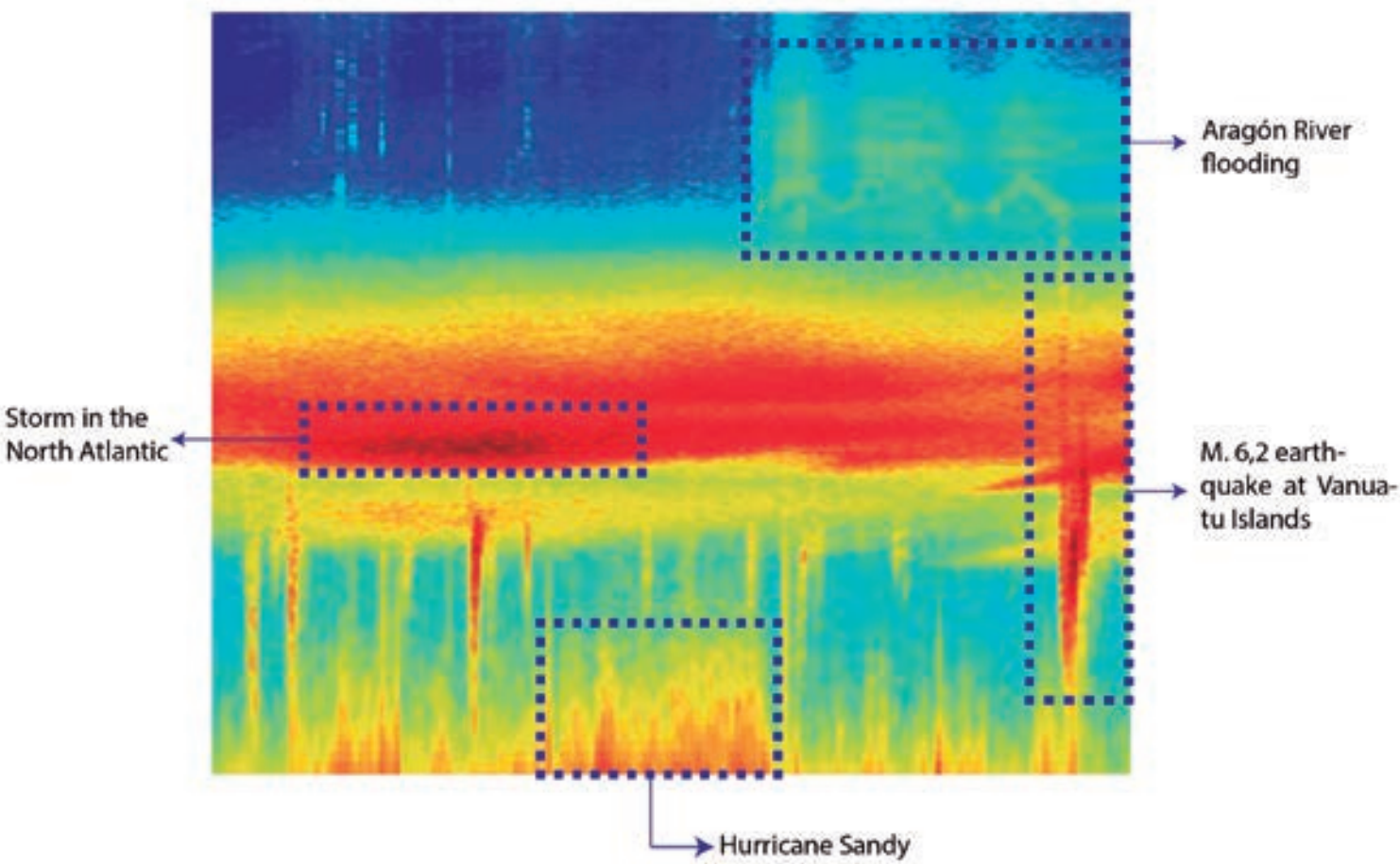
10HP

On the origin of the signals observed across the seismic spectrum

Díaz, J. (2016), On the origin of the signals observed across the seismic spectrum, *Earth-Science Reviews*, 161, 224-232, doi: http://dx.doi.org/10.1016/j.earscirev.2016.07.006.

The increasing number of broad-band seismic stations recording the full spectrum of the seismic wavefield continuously has boosted interest in background signals recorded in the absence of earthquakes. Different human-made and natural phenomena other than earthquakes result in Earth vibrations that are recorded on seismometers. Those signals have classically been considered as disturbing noise, but in the last decades this view has turned, as it has been shown that seismic data can be used not only to monitor earthquake activity, but also to

investigate climatic changes, track hurricanes, monitor river flows, or survey anthropogenic activity, hence making new links between seismology and different research fields. This contribution reviews state-of-the-art knowledge on the sources of seismic energy in different frequency bands using a single, two-weeks-long, seismic data file recorded by a high quality broad-band station located in the Pyrenees. This data allows exploration of the wide spectrum of ground motion, enabling a review of different processes involved in the generation of what seismologists commonly regard as background noise when focusing on ground motion from local and teleseismic earthquakes and explosions recorded in the same time interval.

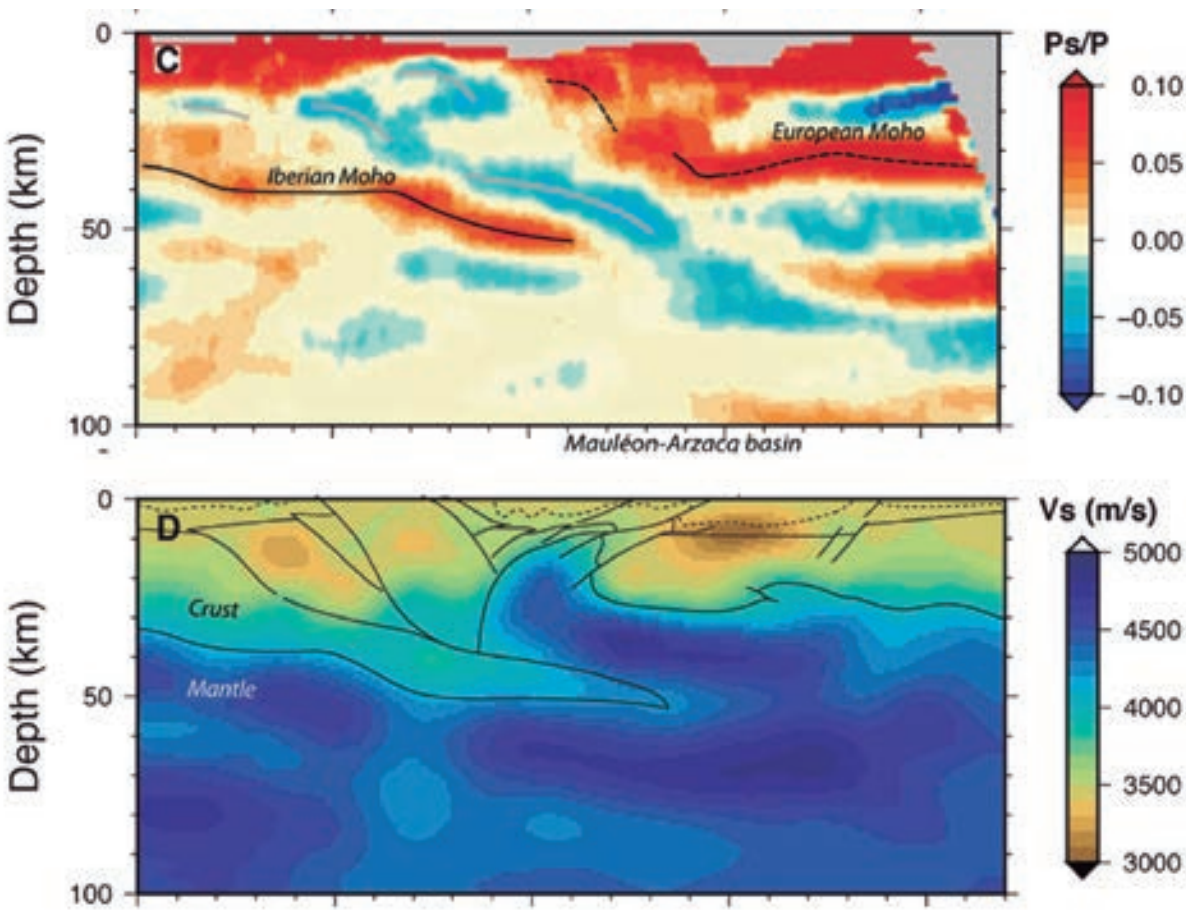


Spectrogram showing the signal received by broad band seismometer at Canfranc. The reddish colors representing large energy values.
(Adapted from *Earth-Sciences Review*)

The deep roots of the western Pyrenees revealed by full waveform inversion of teleseismic P waves

Wang, Y., Chevrot, S., Monteiller, V., Komatitsch, D., Mouthereau, F., Manatschal, G., Sylvander, M., Diaz, J., Ruiz, M.,Grimaud, F., Benahmed, S., Pauchet, H., Martin, R. (2016), The deep roots of the western Pyrenees revealed by full waveform inversion of teleseismic P waves, *Geology*, 44(6), 475-478, doi: 10.1130/g37812.1.

Imaging the architecture of mountain roots is required to understand the support of topography and for kinematic reconstructions at convergent plate boundaries, but is still challenging with conventional seismic imaging approaches. Here we present a three-dimensional model of both compressional and shear velocities in the lithosphere beneath the western Pyrenees (southwest Europe), obtained by full waveform inversion of teleseismic P waves. This tomographic model reveals the subduction of the Iberian crust beneath the European plate, and the European serpentinized subcontinental mantle emplaced at shallow crustal levels beneath the Mauléon basin. The rift-inherited mantle wedge acted as an indenter during the Pyrenean convergence. These new results provide compelling evidence for the role of rift-inherited structures during mountain building in Alpine-type orogens

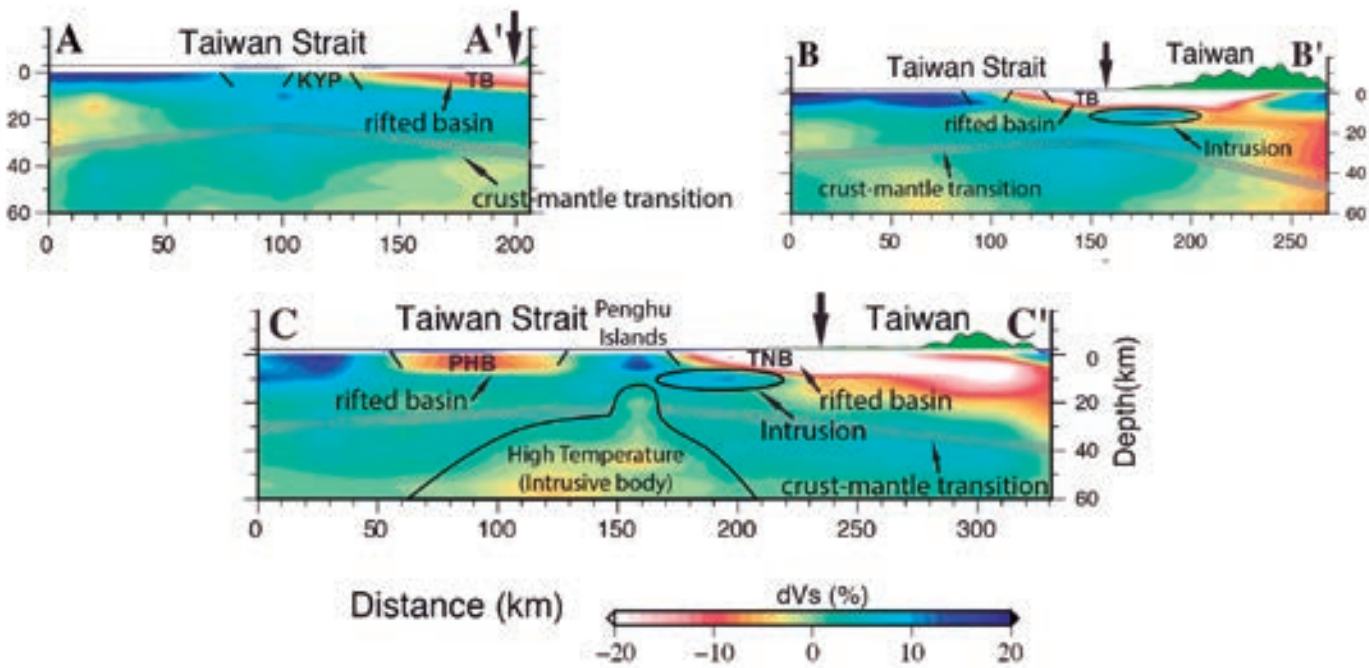


Common conversion point stackof receiver functions for the western transect and Vs model obtained by full waveform inversion (Adapted from *Geology*)

Three-dimensional ambient noise tomography across the Taiwan Strait: The structure of a magma-poor rifted margin

Chen, K.-X., H. Kuo-Chen, D. Brown, Q. Li, Z. Ye, W.-T. Liang, C.-Y. Wang, and H. Yao (2016), Three-dimensional ambient noise tomography across the Taiwan Strait: The structure of a magma-poor rifted margin, *Tectonics*, n/a-n/a, doi: 10.1002/2015TC004097.

Rifting along southeastern Eurasia in the Late Cenozoic led to the formation of a magma-poor rifted margin facing the South China Sea to the southeast and the Philippine Sea to the east. Further rifting along the outer part of the margin during the middle to late Miocene was accompanied by an extensive episode of intraplate flood volcanism that formed the Penghu Archipelago. Previous geophysical studies in the area of the strait have focused primarily on the shallow structures of the rift basins and the depth to the Moho. In this study we present the regional-scale 3-D S wave structure of the Taiwan Strait that is derived from a joint Chinese and Taiwanese 3-D ambient noise tomography study. The S wave model shows a thinning of the crust beneath the rift basins where, locally, thin high-velocity layers suggest the presence of intrusive bodies. The rift basin and the foreland basin along the west coast of Taiwan are imaged as low-velocity zones with thicknesses between 5 and 10?km and extending eastward beneath the Taiwan mountain belt. In the upper 10?km of the crust, the basaltic rocks of the Penghu Archipelago are imaged as a high-velocity zone that, with depth, becomes a relatively low-velocity zone. We interpret this low-velocity zone in the lower crust and upper mantle beneath the Penghu Archipelago to image a thermal anomaly related to the still cooling magma feeding system and the melt reservoir area that fed the flood basalts at the surface.



Vertical sections of the shear wave velocity anomalies (dVs).A low-velocity zone beneath the Penghu Archipelago could relate to a thermal anomaly. TB: Taihsi Basin. PHB: Penghu Basin. TNB: Tainan Basin. KYP: Kuanyin Platform. Thick vertical arrow: the western coastline of Taiwan. (Adapted from *Tectonics*)

Deformation of the Nankai Trough inner accretionary prism: The role of inherited structures

Boston, B., G. F. Moore, M. J. Jurado, and H. Sone (2016), Deformation of the Nankai Trough inner accretionary prism: The role of inherited structures, Geochemistry, Geophysics, *Geosystems*, n/a-n/a, doi: 10.1002/2015GC006185.

We propose a simple volcanic risk coefficient (VRC) useful for comparing the degree of risk arising from different volcanoes, which may be used by civil protection agencies and volcano observatories to rapidly allocate limited resources even without a detailed knowledge of each volcano. Volcanic risk coefficient is given by the sum of the volcanic explosivity index (VEI) of the maximum expected eruption from the volcano, the logarithm of the eruption rate, and the logarithm of the population that may be affected by the maximum expected eruption. We show how to apply the method to rank the risk using as examples the volcanoes of Italy and in the Canary Islands. Moreover, we demonstrate that the maximum theoretical volcanic risk coefficient is 17 and pertains to the large caldera-forming volcanoes like Toba or Yellowstone that may affect the life of the entire planet. We develop also a simple plugin for a dedicated Quantum Geographic Information System (QGIS) software to graphically display the VRC of different volcanoes in a region.

Activity inside the Deep Sea Drilling Vessel Chikyu. (Image: María José Jurado)

The Lost World's pristinity at risk

Rull, V., T. Vegas-Vilarrúbia and E. Safont (2016), The Lost World's pristinity at risk, *Diversity and Distributions*, 22(10), 995-999, doi: 10.1111/ddi.12469..

The Guayana Highlands (GH) are virtually pristine environments and constitute a unique natural laboratory to study the biogeographical and evolutionary origin of the Neotropical biota. In addition, the GH provide most of the water of the Guayana region, which feeds the more important tributaries of the Orinoco and the Amazon basins. However, the biota and the ecosystems of the GH are in danger of being profoundly altered by current human activities. Recent studies have identified the presence of aggressive invader plant species (e.g. Poa annua and Polypogon elongatus) and infectious faecal bacteria (Helicobacter pilori), both carried by tourists, which could deeply affect biodiversity and ecological performance of terrestrial and aquatic GH ecosystems. If these hazards are not controlled as soon as possible, the potential consequences could disturb not only the GH ecosystems but also those of the rest of the Guayana region. We still have time to find solutions and implement specific regulations before the mentioned threats become uncontrollable. The GH are within a national park and other conservation figures but a management plan is lacking; therefore, current conservation rules are insufficient to deal with the newly detected menaces. We propose an international initiative, including all countries of the Guayana Shield, to take immediate actions. Otherwise, we are in danger of losing one of the few pristine biomes that remain in the world.

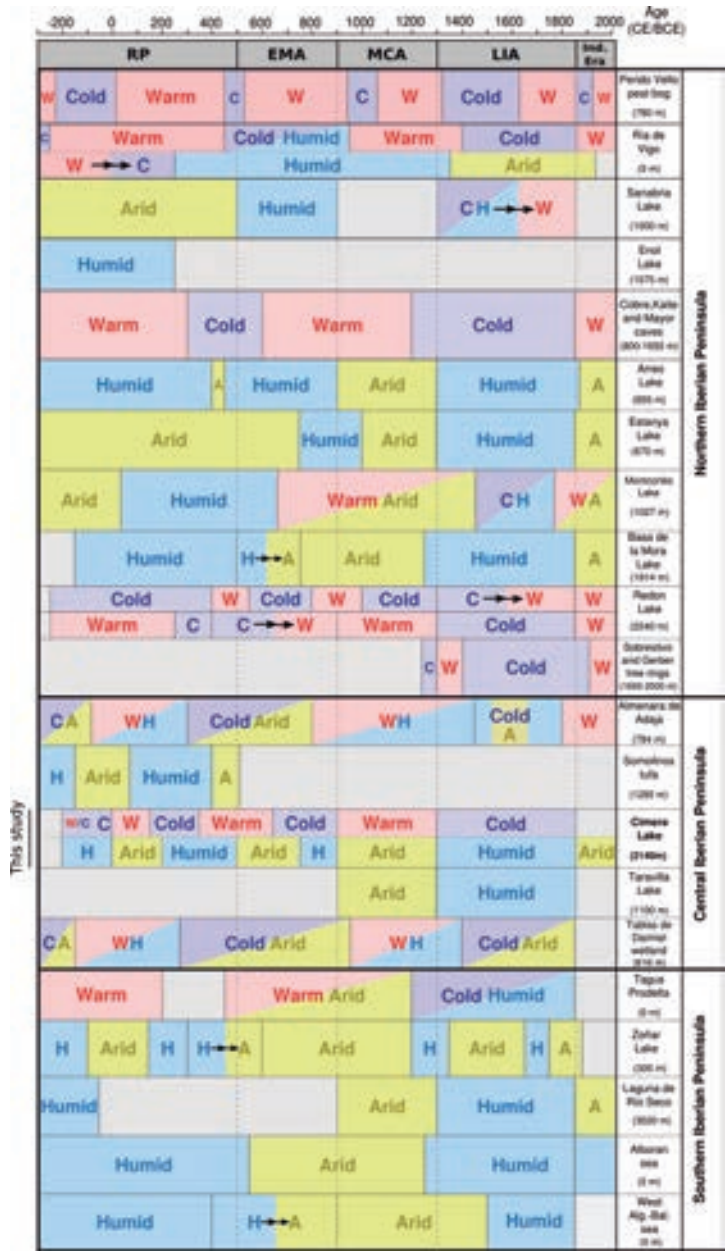
A) Map of the north of South America indicating the position of the Guyana Shield (black outline). The Guayana Highlands lie within the white circle and Mount Roraima is indicated by a red star. The numbers indicate areas of high priority for conservation, according to the Guyana Shield Facility (GSF) (http://guianashield.org/)

B) General view of Mount Roraima with the Gran Sabana in the foreground. (Photo: V. Rull)

Climate reconstruction for the last two millennia in central Iberia: The role of East Atlantic (EA), North Atlantic Oscillation (NAO) and their interplay over the Iberian Peninsula

Sánchez-López, G., et al. (2016), Climate reconstruction for the last two millennia in central Iberia: The role of East Atlantic (EA), North Atlantic Oscillation (NAO) and their interplay over the Iberian Peninsula, *Quaternary Science Reviews*, 149, 135-150, doi: http://dx.doi.org/10.1016/j.quascirev.2016.07.021.

A multi-proxy characterization of the uppermost sedimentary infill of an Iberian alpine lake (Cimera, 2140 m a.s.l.) was performed to establish the climatic and environmental conditions for the Iberian Central Range (ICR) over the last two millennia. This multi-proxy characterization was used to reconstruct the intense runoff events, lake productivity and soil erosion in the lake catchment and interpret these factors in terms of temperature and precipitation variability. The Roman Period (RP; 200 BCE – 500 CE) beginning was characterized by an alternation between cold and warm periods as indicated by short-lived oscillations of intense runoff conditions and soil erosion, although warm conditions dominated the end of the period and the Early Middle Age (EMA; 500–900 CE) onset in the ICR. A noticeable decrease in intense runoff events and a progressive decrease in soil erosion during the late EMA indicated a shift to colder temperatures. In terms of precipitation, both the RP and EMA climate periods displayed a transition from dry to wet conditions that led to a decrease in lake productivity. The Medieval Climate Anomaly (MCA; 900–1300 CE) was characterized by warm and dry conditions with frequent intense runoff episodes and increases in lake productivity and soil erosion, whereas the Little Ice Age (LIA; 1300–1850 CE) showed the opposite characteristics. The Industrial Era (1850–2012 CE) presented an increase in lake productivity that likely demonstrates the influence of global warming. The spatio-temporal integration of the Cimera record



The interplay between the North Atlantic Oscillation and East Atlantic climate modes for the last 2,000 years in Iberia explains the climatic periods and their spatial differences.(Image: Guiomar Sánchez-López)

with other Iberian reconstructions has been used to identify the main climate drivers over this region. During the RP and EMA, N–S and E–W humidity gradients were dominant, whereas during the MCA and LIA, these gradients were not evident. These differences could be ascribed to interactions between the North Atlantic Oscillation (NAO) and East Atlantic (EA) phases. During the RP, the general warm conditions and the E–W humidity gradient indicate a dominant interplay between a negative NAO phase and a positive EA phase (NAO−–EA+), whereas the opposite conditions during the EMA indicate a NAO+–EA- interaction. The dominant warm and arid conditions during the MCA and the cold and wet conditions during the LIA indicate the interplay of the NAO+–EA+ and NAO−–EA-, respectively. Furthermore, the higher solar irradiance during the RP and MCA may support the predominance of the EA+ phase, whereas the opposite scenario during the EMA and LIA may support the predominance of the EA- phase, which would favour the occurrence of frequent and persistent blocking events in the Atlantic region during these periods.

Years to weeks of seismic unrest and magmatic intrusions precede monogenetic eruptions

Albert, H., F. Costa, and J. Martí (2016), Years to weeks of seismic unrest and magmatic intrusions precede monogenetic eruptions, *Geology*, doi: 10.1130/g37239.1.

Seismic, deformation, and gas activity (unrest) typically precedes volcanic eruptions. Tracking the changes of this activity with monitoring data makes it increasingly possible to successfully forecast eruptions from stratovolcanoes. However, this is not the case for monogenetic volcanoes. Eruptions from these volcanoes tend to be small but are particularly difficult to anticipate since they occur at unexpected locations and there is very limited instrumental monitoring data. Many monogenetic volcanic fields occur in high-density, populated areas and/or tourist destinations, and thus even a small eruption can have a major economic and societal impact. We have gathered the available instrumental data for unrest and combined it with new historical accounts of seismicity. Our occurrences are mainly from high magmatic flux oceanic islands (Canary Islands, Iceland, Papua New Guinea, Mexico, and Japan). We find that seismic activity may start one or two years before eruption, but it intensifies at approximately two or three months, and one or two weeks. The petrological and geochemical characteristics of the deposits show that multiple magma batches interacted in a subvolcanic reservoir, and multiple intrusions occurred on a similar time scales to the seismicity. We propose a general model for these eruptions where early dike intrusions in the crust do not erupt (e.g., stalled intrusions) and make small plumbing systems, but they probably are key in creating a thermal and rheological pathway for later dikes to be able to reach the surface. These observations provide a conceptual framework for better anticipating monogenetic eruptions in similar settings and magmatic fluxes and should lead to improved strategies for mitigation of their associated hazards and risks.

Volcanic ash leaching as a means of tracing the environmental impact of the 2011 Grímsvötn eruption, Iceland

Cabré, J., M. Aulinas, M. Rejas, and L. J. Fernandez-Turiel (2016), Volcanic ash leaching as a means of tracing the environmental impact of the 2011 Grímsvötn eruption, Iceland, Environmental Science and Pollution Research, 1-16, doi: 10.1007/s11356-016-6559-7.

Gas station in Kirkubajaklaustur, Iceland, during Grímsvötn eruption.
(Author: David García Balbuena)

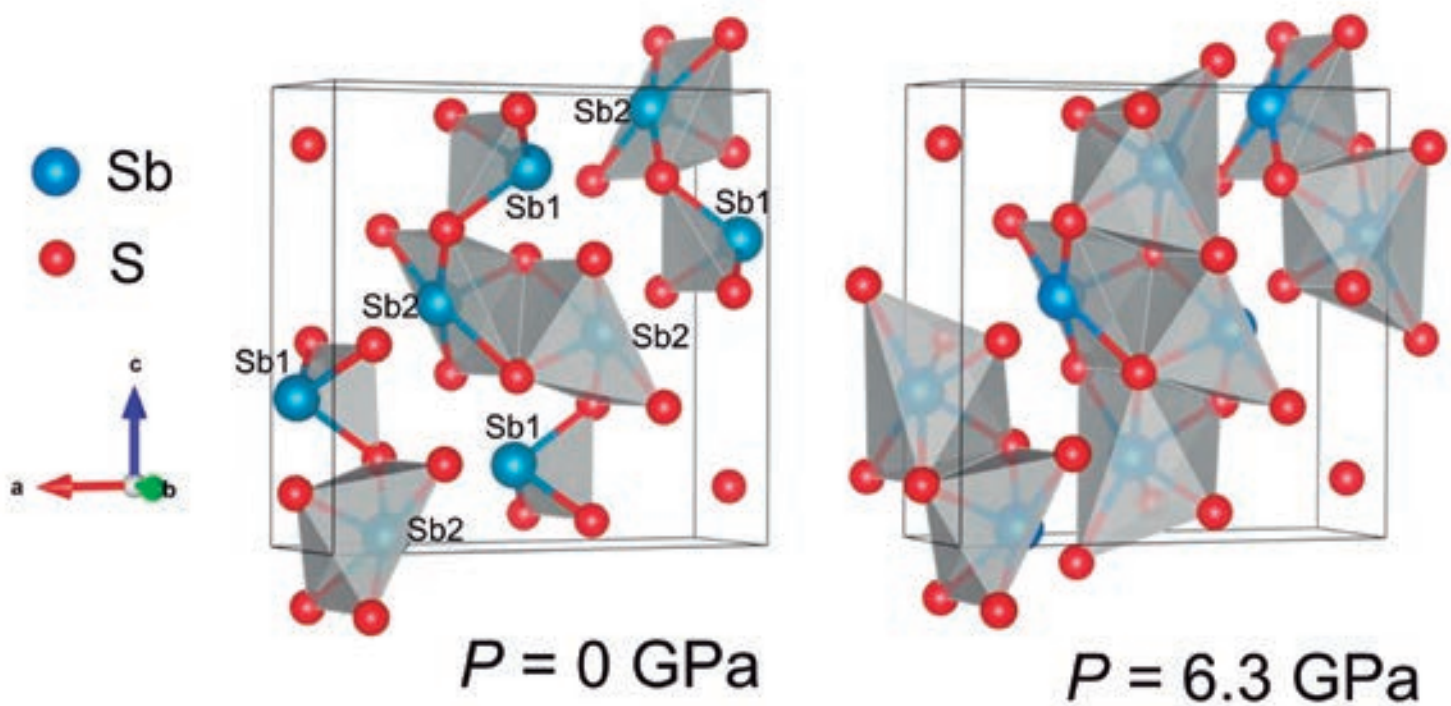
Josep Cabré taking ash samples in Iceland during Grímsvötn eruption.
(Author: Oscar Pérez Santacecilia)

The Grímsvötn volcanic eruption, from 21 to 28 May, 2011, was the largest eruption of the Grímsvötn Volcanic System since 1873, with a Volcanic Explosivity Index (VEI) of magnitude 4. The main geochemical features of the potential environmental impact of the volcanic ash-water interaction were determined using two different leaching methods as proxies (batch and vertical flow-through column experiments). Ash consists of glass with minor amounts of plagioclase, clinopyroxene, diopside, olivine and iron sulphide; this latter mineral phase is very rare in juvenile ash. Ash grain morphology and size reflect the intense interaction of magma and water during eruption. Batch and column leaching tests in deionised water indicate that Na, K, Ca, Mg, Si, Cl, S and F had the highest potential geochemical fluxes to the environment. Release of various elements from volcanic ash took place immediately through dissolution of soluble salts from the ash surface. Element solubilities of Grímsvötn ash regarding bulk ash composition were <1 %. Combining the element solubilities and the total estimated mass of tephra (7.29×10^{14} g), the total inputs of environmentally important elements were estimated to be 8.91×10^{9} g Ca, 7.02×10^{9} g S, 1.10×10^{9} g Cl, 9.91×10^{8} g Mg, 9.91×10^{8} g Fe and 1.45×10^{8} g P The potential environmental problems were mainly associated with the release of F (5.19×10^{9} g).

Structural, Vibrational, and Electronic Study of Sb_2S_3 at High Pressure

Ibáñez, J., J. A. Sans, C. Popescu, J. López-Vidrier, J. J. Elvira-Betanzos, V. P. Cuenca-Gotor, O. Gomis, F. J. Manjón, P. Rodríguez-Hernández, and A. Muñoz (2016), Structural, Vibrational, and Electronic Study of Sb_2S_3 at High Pressure, The Journal of Physical Chemistry C, doi: 10.1021/acs.jpcc.6b01276.

Antimony trisulfide (Sb_2S_3), found in nature as the mineral stibnite, has been studied under compression at room temperature from a joint experimental and theoretical perspective. X-ray diffraction and Raman scattering measurements are complemented with *ab initio* total-energy, lattice-dynamics, and electronic structure calculations. The continuous changes observed in the volume, lattice parameters, axial ratios, bond lengths, and Raman mode frequencies as a function of pressure can be attributed to the different compressibility along the three orthorhombic axes in different pressure ranges, which in turn are related to the different compressibility of several interatomic bond distances in different pressure ranges. The structural and vibrational properties of Sb_2S_3 under compression are compared and discussed in relation to isostructural Bi_2S_3 and Sb_2Se_3. No first-order phase transition has been observed in Sb_2S_3 up to 25 GPa, in agreement with the stability of the *Pnma* structure in Bi_2S_3 and Sb_2Se_3 previously reported up to 50 GPa. Our measurements and calculations do not show evidence either for a pressure-induced second-order isostructural phase transition or for an electronic topological transition in Sb_2S_3.

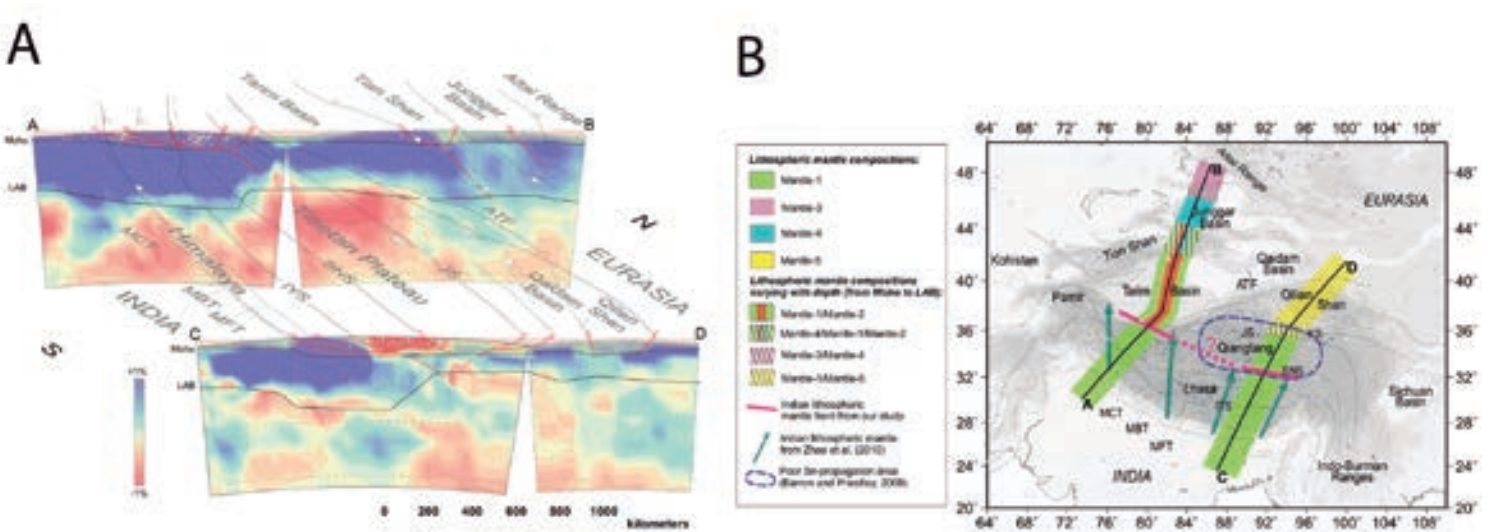


Crystalline structure of orthorhombic Sb_2S_3 at ambient pressure (left) and under compression (right), obtained from a joint experimental and theoretical study of the structural, vibrational and electronic properties of the mineral stibnite. For this work, synchrotron XRD measurements were performed at high-pressures, using the diamond-anvil cell technique. The figure shows how at ambient pressure the structure of stibnite is based on SbS_3 and SbS_5 units, while at larger pressures (6.3 GPa) the SbS_3 units become into SbS_6 polyhedra due to the overall reduction of bond lengths. (Image: Adapted from *The Journal of Physical Chemistry*)

Geophysical-petrological model of the crust and upper mantle in the India-Eurasia collision zone

Tunini, L., I. Jiménez-Munt, M. Fernandez, J. Vergés, A. Villaseñor, M. Melchiorre, and J. C. Afonso (2016), Geophysical-petrological model of the crust and upper mantle in the India-Eurasia collision zone, Tectonics, n/a-n/a, doi: 10.1002/2016TC004161.

We present a new crust and upper mantle cross section of the western India-Eurasia collision zone by combining geological, geophysical, and petrological information within a self-consistent thermodynamic framework. We characterize the upper mantle structure down to 410km depth from the thermal, compositional, and seismological viewpoints along a profile crossing western Himalayan orogen and Tibetan Plateau, Tarim Basin, Tian Shan, and Junggar Basin, ending in the Chinese Altai Range. Our results show that the Moho deepens from the Himalayan foreland basin (~40km depth) to the Kunlun Shan (~90km depth), and it shallows to less than 50km beneath the Tarim Basin. Crustal thickness between the Tian Shan and Altai mountains varies from ~66km to ~62km. The depth of the lithosphere-asthenosphere boundary (LAB) increases from 230km below the Himalayan foreland basin to 295km below the Kunlun Shan. To NE the LAB shallows to ~230km below the Tarim Basin and increases again to ~260km below Tian Shan and Junggar region and to ~280km below the Altai Range. Lateral variations of the seismic anomalies are compatible with variations in the lithospheric mantle composition retrieved from global petrological data. We also model a preexisting profile in the eastern India-Eurasia collision zone and discuss the along-strike variations of the lithospheric structure. We confirm the presence of a noticeable lithospheric mantle thinning below the Eastern Tibetan Plateau, with the LAB located at 140km depth, and of mantle compositional differences between the Tibetan Plateau and the northern domains of Qilian Shan, Qaidam Basin, and North China.



(a) Along-strike comparison of the resulting crustal and lithospheric mantle structures of the two modeled profiles, superimposed to the seismic tomography. (b) Resulting mantle compositions and localization of the northern edge of the Indian mantle lithosphere. (Image adaptaed from *Tectonics*)

Other activities

OA

ACADEMY MEMBER

La Dra. Montserrat Torné Acadèmica Numerària de la Reial Acadèmia de Ciències i Arts de Barcelona

La Dra. Montserrat Torné i Escasany va ingressar el 24 d'octubre de 2017 com Acadèmica Numerària de la Reial Acadèmia de Ciències i Arts de Barcelona (RACAB). Torné és Doctora en Ciències Geològiques per la Universitat de Barcelona (1988). En el període 1988-1992 va fer una estança post doctoral en el "Lamont Earth Observatory" de la Universitat de Columbia de Nova York i, posteriorment, en el Departament de Ciències de la Terra de la Universitat d'Oxford. Al juny de 1992 s'incorpora a l'Institut de Ciències de la Terra "Jaume Almera" del CSIC, sent directora del centre en 2000-2001 i 2012-2014. A mitjans de 2001 inicia una etapa dedicada a la gestió de la ciència i la política científica que finalitza a finals del 2011. Durant aquest període va ocupar llocs centrats en la recerca i les relacions internacionals, com la vicepresidència del CSIC, i diverses direccions generals del Ministerio de Educación y Ciencia i del Ministerio de Ciencia e Innovación, dels quals destaca la Dirección General de Investigación y Gestión del Plan Nacional de I+D+i. També va fer una parada a Barcelona com a directora executiva d'ICREA abans de continuar a Madrid. Finalment va tornar a Barcelona com a directora de l'Institut de Ciències de la Terra Jaume Almera (2012-2014). Es autora de 4 llibres, 2 monografies i 82 articles científics i de divulgació. Es dedica a estudiar aspectes relacionats amb la composició i estructura de la Litosfera i la seva interacció amb l'Astenosfera. En particular la seva recerca s'ha desenvolupat en l'estudi de les propietats físiques de la litosfera continental i oceànica i de la formació de marges continentals i conques en extensió. Es membre de l'Acadèmia Europaea (2003) i del Consell d'Alumni UB (2011).(Source: RACAB)

Dra. Montserrat Torné during her conference in Reial Acadèmia de Ciències i Arts de Barcelona. (Image: RACAB)

RETIRED MEMBER

Pere Anadón Monzón

Pere Anadón Monzón es va jubilar al 2016.

Durant els 35 anys de servei en el CSIC, des de que al maig de 1981 es va incorporar a la plantilla de l'aleshores Instituto de Geología Jaime Almera, tots nosaltres hem gaudit d'un investigador excel·lent i una persona exemplar.

En Pere Anadón ha estat un dels artífexs de la modernització de la Geologia al nostre país, contribuint a la actual visió de la reconstrucció paleoambiental de sediments no marins, principalment lacustres, a partir de la estratigrafia i sedimentologia juntament amb les dades paleoecològiques i geoquímiques dels organismes carbonatats. Tot això sense oblidar la seva passió per l'enquadrament històric de la recerca geològica.

La carrera professional d'en Pere va començar amb la Llicenciatura en Ciències Geològiques a la Facultat de Ciències de la Universitat de Barcelona (UB) al juliol de 1973; va obtenir el doctorat a la UB al juny de 1978 . Va ser Professor Ajudant i després Adjunt de la Facultat de Geologia de la UB entre 1977 i 1981. La seva tesi doctoral es va fer gràcies a una beca predoctoral del CSIC a l'Institut Jaume Almera.

En un començament, a la tesina i la tesi doctoral, la seva recerca va ser més de tipus estratigràfica i sedimentològica de successions continentals, sobre tot lacustres. Posteriorment, introduí les aproximacions paleoecològiques i geoquímiques, d'elements minoritaris i traça i d'isotopia de carboni, oxigen i estronci, aplicades a diferents organismes carbonatats per a la reconstrucció paleoambiental de les successions lacustres.

Els seus més de 150 treballs científics tracten fonamentalment sobre seqüències sedimentàries terciàries en la Conca Mediterrània, des de la Península Ibèrica, passant per Itàlia i fins a Grècia, sent una referència de prestigi internacional en la matèria.

També ha participat en nombroses tasques de servei a la comunitat científica i, en particular, de l'Institut. Com a exemple més proper, tots recordem el seu paper en la celebració dels 50 Anys del l'Institut, en especial, com responsable de la edició del llibre commemoratiu d'aquest aniversari.

Pere Anadón in a field trip in the early summer of 2016. (Author: Jordi Cortés)

ICTJA-CSIC PhD students in a mentoring trip to La Garrotxa Volcanic Field. (Image: Jordi Cortés)

PhD THESES

- *Title:* Palaeoecological Study Of Vegetation Dynamics In The Neotropical Gran Sabana Since The Late Glacial
  PhD Student: Tania Marcela Ballesteros Larrotta
  PhD Advisors: Dr. Encarni Montoya and Dr. Teresa Vegas Vilarrúbia
  Place and date: Universitat de Barcelona (UB), 08/02/2016

- *Title:* Flora And Vegetation Of The Guayana Highlands: Past Dynamics, Global Warming And Conservation Guidelines
  PhD Student: Elisabet Safont Crespo
  PhD Advisors: Dr. Valentí Rull (ICTJA-CSIC) and Dr. Teresa Vegas Vilarrúbia (UB)
  Place and date: Universitat de Barcelona, 09/02/2016

- *Title:* North Atlantic Oscillation Imprints In The Central Iberian Peninsula For The Last Two Millennia: From Ordination Analyses To The Bayesian Approach
  PhD Student: Guiomar Sánchez López
  PhD Advisors: Dr. Santiago Giralt (ICTJA-CSIC) and Dr. Armand Hernández (IDL-Universidade de Lisboa)
  Place and date: Universitat de Barcelona (UB), 16/09/2016

- *Title:* Seismic Attenuation Analysis Using Lg Waves And Ambient Noise Recordings: Application To The Iberian Peninsula And Morocco
  PhD Student: Raquel Noriega Salmón
  PhD Advisors: Dr. Antonio Villaseñor (ICTJA-CSIC) and Dr. María José Jurado (ICTJA-CSIC)
  Place and date: Universitat de Barcelona (UB), 16/09/2016

- *Title:* Late Holocene Climate Variability In The North Atlantic Based On A Biomarker Reconstruction. The Lake Azul (Sao Miguel Island, Azores Archipelago) Case
  PhD Student: María Jesús Rubio de Inglés
  PhD Advisors: Dr. Santiago Giralt (ICTJA-CSIC) Dr. Alberto Sáez (UB)
  Place and date: Universitat de Barcelona (UB), 19/09/2016

- *Title:* The Lithospheric Structure Of Africa. Mapping Crustal And Lithospheric Thickness Using Geoid And Elevation Constraints Together With A Thermal Analysis
  PhD Student: Jan Globig
  PhD Advisors: Dr. Manel Fernández (ICTJA-CSIC) and Dr. Montserrat Torné (ICTJA-CSIC)
  Place and date: Universitat de Barcelona (UB), 21/09/2016

- *Title:* High-pressureoptical and vibrational properties of InN and InGaN
  PhD Student: Robert Oliva Vidal
  PhD Advisor: Dr. Jordi Ibáñez Insa
  Place and date: Universitat de Barcelona (UB), 11/10/2016

MASTER THESES

Title: Análisis de la peligrosidad volcánica del volcanismo monogenético del sur de Tenerife (Islas Canarias)
Master Student: Mario Rubén Guzmén Jordén
Master Advisor: Dr. Adelina Geyer (ICTJA-CSIC)
Laura Becerril (ICTJA-CSIC)
Place and date: Facultat de Geologia-(UB) - 05/02/2016

Title: Análisis de sensibilidad de los parámetros de entrada en el modelo probabilístico de flujos de lava
Master Student: Irene Velasco Arenós
Master Advisor: Dr. Adelina Geyer (ICTJA-CSIC)
Stefania Bartolini (ICTJA-CSIC)
Place and date: Facultat de Geologia-(UB) - 05/02/2016

Title: Carbonate propect identification and delineation in Southwestern Venezuela by seismic attributes
Master Student: Pedro Pablo Camacho Dugarte
Master Advisors: Dr. Ramon Carbonell (ICTJA-CSIC) and Dr. Montserrat Torné (ICTJA-CSIC)
Place and date: Facultat de Geologia-(UB) - 05/07/2016

Title: Seismic Reflection imaging of the Alhama de Murcia Fault (Epicentral area of the Lorca 2011 Earthquake)
Master Student: Rosangela Gascón Padrón
Master Advisor: Dr. Ramon Carbonell (ICTJA-CSIC)
Place and date: Facultat de Geologia-(UB) - 05/07/2016

Title: 3-D modelling of the crustal structure of the Gulf of Cadiz using gravity and seismic data
Master Student: Carolina Salas Morán
Master Advisors: Dr. Montserrat Torné (ICTJA-CSIC) and Dr. Manel Fernández (ICTJA-CSIC)
Place and date: Facultat de Geologia-(UB) - 05/07/2016

Title: High-pressure optical properties of silicon nanocrystals
Master Student: Martí Busquets i Massó
Master Advisor: Jordi Ibáñez (ICTJA-CSIC)
Place and date: Facultat de Físiques-(UB) 14/07/2016

ORGANIZATION OF CONGRESSES

EGU General Assembly poster hall. (Author: Jordi Cortés)

- **Sesion T9: Geofísica,** IX Congreso de Geología de España, Huelva, Spain, September 12-14, , 2016, Ramon Carbonell, Convener & Co-convener.
- **2nd VeTOOLS Meeting**, Barcelona, Spain, November 10-13 , 2016, Joan Martí; Steffania Bartolini; Laura Becerril, Organizers.
- **The 6th International Maar Conference, IAVCEI**, Changchun, China, July 30-August 3, 2016, Joan Martí, Co-Chair Scientific Committee.
- **Session S1.11: Volcanic hazards knowledge and awareness in places without frequent eruptions: how to wait for next eruption**. IAVCEI Cities on Volcanoes 9, Puerto Varas, Chile, November 20-25, 2016, Joan Martí, Convener.
- **Session S1.16: Protected volcanic landscapes and volcano-heritage - a new frontier for the application of volcano science**. IAVCEI Cities on Volcanoes 9, Puerto Varas, Chile, November 20-25, 2016, Joan Martí, Convener.
- **Ambient Seismic Noise Techniques: Sources, Monitoring and Imaging, special session SM4.1**, *EGU 2016 (European Geophysical Union)*, Wien, Austria, April, *2016*, Martin Schimmel, Convener.
- **Session SS13: Non-pollen palynomorphs as indicators of environmental and anthropogenic processes in palaeoecology: frontiers and advances in methodology and interpretations**, *XIV IPC - X IOPC Conference, Salvador de Bahía, Brazil,* October 23-28, 2016. Encarni Montoya, Convener.

EDITORIAL ACTIVITIES

- **Geophysical Journal International**: Martin Schimmel, Editorial Board
- **Geologica Acta**: Santiago Giralt, Editorial Board; Joaquina Álvarez-Marrón, Managing Scientific Editor
- **Frontiers in Ecology and Evolution**: Valentí Rull, Associate Editor
- **Frontiers in Pnat Science**: Valentí Rull, Associated Editor
- **Frontiers in Earth Science**: Juan Cruz Larrasoaña, Associate Editor; V. Rull, Associate Editor
- **Frontiers in Volcanology**: Adelina Geyer, Associate Editor
- **Geological Society of America Bulletin**: Dennis Brown, Editorial Board
- **Geology**: Dennis Brown, Editorial Board
- **Journal of Asian Earth Sciences**: Dennis Brown, Editorial Board
- **Journal of Volcanology and Geothermal Research**: Joan Martí, Editor-in-Chief
- **Palinology**: Encarni Montoya, Editorial Board
- **Special Publications of the International Union of Geodesy and Geophysics**: Joan Martí, Editorial Board
- **Studia Geophysica et Geodaetica**: Manel Fernández, Associate Editor
- **Tectonophysics**: Ramon Carbonell, Editor-in-Chief

INTERNATIONAL AND NATIONAL COMMITEES

- **Evaluation Panel ANR, Agence Nationale de la Recherche, Program Earth Science and Climate**, Dennis Brown, Board Member
- **Evaluation Panel of ANR Agence Nationale de la Recherche, Program Earth Science and Climate**, Ramon Carbonell, Board Member
- **Advisory Committee of Natural Hazards (EU H2020)**, Joan Martí, Member
- **Scientific Advisory Committee of "Service National d'Observation en Volcanologie", CNRS-INSU, France**, Joan Martí, President
- **Executive Board of International Union of Geodesy and Geophysics (IUGG)**, Joan Martí, Member
- **IUGG Commission of Geophysical Risk**, Joan Martí, President
- **SCAR Expert group on Antartic Volcanism (ANTVOLC)**, Adelina Geyer, Deputy Chair
- **ESSEM COST Action ES1401, EU, European Cooperation in Science and Technology**, Martin Schimmel, Management Committee Member
- **ESSEM COST Action ES1401, EU, European Cooperation in Science and Technology**, Martin Schimmel, Working Group 2 Leader
- **ESSEM COST Action ES1401, EU, European Cooperation in Science and Technology**, Martin Schimmel, Core Member
- **ESSEM COST Action ES1401, EU, European Cooperation in Science and Technology**, Martin Schimmel, STSM (Short-Term Scientific Member) Board

- **Panel de evaluadores FONCyT, Ministerio de Ciencia, Tecnologica e Innovacion Productiva, Argentina**, Carles Soriano Clemente
- **Panel de evaluadores CINECA, Ministero dell'Istruzione dell'Università e della Ricerca, Italia**, Carles Soriano Clemente
- **Member of the European Geoscience Union, Tectonics Division Programme Committee**. Daniel García-Castellanos
- **Member of the Earth Sciences PhD Academic committee, Universitat de Barcelona**, Joaquina Álvarez-Marron
- **Member of the Earth Sciences PhD supervising committee, Universitat de Barcelona**, Daniel García-Castellanos
- **Member of the Earth Sciences PhD supervising committee, Universitat de Barcelona**, José Luis Fernandez-Turiel
- **Member of the Earth Sciences PhD supervising committee, Universitat de Barcelona**, Joaquina Álvarez-Marron
- **Comisión de evaluación XV Certamen Universitario Arquímedes, Ministerio de Educacion Cultura y Deporte**, Joaquina Álvarez-Marron
- **Sociedad Geológica de España, Governing Board Member**, Joaquina Álvarez-Marron
- **Comissió Dona i Ciència del Consell Interuniversitari de Catalunya**, Joaquina Álvarez-Marrón, Dessigned Member

INVITED SCIENTISTS

- **Ramon Carbonell**, Facultad de Ciencias Exactas, Física y Naturales, Universidad de San Juan, Argentina, November 2016
- **Joan Martí,** Earth Observatory of Singapore, Nanyang Technological University of Singapore, January-February 2016
- **Daniel García-Castellanos,** Laboratorio de Modelado Geológico (LaMoGe), Departamento de Ciencias Geológicas, Universidad de Buenos Aires, Argentina, July 2016
- **Martin Schimmel,** Departamento de Geofísica (DGEF) del Centro de Ciencias Exactas y de la Tierra (CCET), Universidad Federal do Rio Grande do Norte (UFRN), March-April 2016
- **Martin Schimmel,** Institute Physique du Globe de Paris (IPGP), January & June 2016
- **Martin Schimmel**, Department of Seismology, National University of La Plata, Argentina, December 2016
- **Daniel García-Castellanos**, Oregon Water Science Center (USGS), September 2016

GUEST & VISITING SCIENTIST

- **Jose Luís Macías Vázquez**, Universidad Nacional Autónoma de México (UNAM), México, Joan Martí
- **Silvina Guzmán**, Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Argentina, Joan Martí
- **Eleonore Stutzmann**, Institute Physique du Globe de Paris (IPGP), France, Martin Schimmel
- **Nick Loughlin**, Open University, England, Encarni Montoya
- **Charlie Foster**, Oxford Brookes University, England, Encarni Montoya
- **Dario de Giuseppe**, Università degli Studi di Ferrara, Italy, Jordi Ibáñez

INVITED TALKS

- **L'origen de la biodiversitat neotropical: vicis, paradigmes i sol·lucions**. Museu de ciències Naturals de Barcelona, Barcelona, Spain, 9 February 2016, Valentí Rull
- **Subduction-Driven Recycling of Continental Margin Lithosphere**, EGU2016-8518, Viena, Austria, April 2016, Ramon Carbonell
- **Què va pasar realment a l'Illa de Pasqua?** CaSEs seminars: Transdiciplinary approaches to human culture, Universitat Pompeu Fabra, Barcelona, Spain, 17 May 2016, Valentí Rull
- **Origen de las sabanas neotropicales: pistas del pasado de la Gran Sabana**, CaSEs seminars: Transdiciplinary approaches to human culture, Universitat pompeu Fabra, Barcelona, Spain, 3 June 2016, Encarni Montoya
- **Tectònica, glaciacions i biodiversitat**. Conferència acte graduació Facultat de Geologia, Universitat de Barcelona, Barcelona, Spain, 14 July 2016, Valentí Rull
- **Como ser geóloga y no morir en el intento**, Congreso Geología de España, Huelva, Spain, September 2016, Joaquina Álvarez-Marrón
- **Volcanes: El Fuego de la Tierra**. Ciclo de Conferencias "Qué sabemos de..." (Museo de la Ciencia de Valladolid y CSIC), Museo de la Ciencia, Valladolid, Spain, 15 November, 2016 Joan Martí
- **Characterization of the Continental Crust**, Facultad de Ciencias Exactas, Fisica y Naturales Universidad de San Juan, Argentina,- November 2016, Ramon Carbonell
- **L'abellaïta: la primera espècie mineral nova descoberta a Catalunya**, Conferències Mineralògiques de Tardor 2016, Institut d'Estudis Catalans (IEC), Barcelona, Spain, 2 December 2016, Jordi Ibáñez
- **Ambient noise signal extraction: The phase coherence approach**, Advanced Training School: Seismic Noise: From Generation to Interferometry, Sesimbra, Portugal, September 2016, Martin Schimmel

SEMINARS

- **Aplicación de la Resonancia de Spin Electrónico (ESR) en la datación de terrazas antiguas de la Cuenca del Duero, Cuenca del Ebro y Cuenca del Tajo**
  Lecturer: Dra. Davinia Moreno, Centro Nacional de Investigación sobre la Evolución Humana (CENIEH)
  Date: Feb, 17, 2016

- **Pressure: a key to modify the crystal structure**
  Lecturer: Dr. Juan Àngel Sans, Instituto de Diseño para la Fabricación y Producción Automatizada (Universitat Politècnica de València)
  Date: Feb, 24, 2016

- **Dinosaures a partir del registre del Pirineu: història, troballes, paleontòlegs, coneixements, importància**
  Lecturer: Dr. Bernat Vila, Institut Català de Paleontologia Miquel Crusafont i el Museu de la Conca Dellà
  Date: Mar, 09, 2016

- **Aplicacions de l'anàlisi d'isòtops estables en arqueologia. Possibilitats i perspectives**
  Lecturer: Dra. Sílvia Valenzuela-Lamas, University of Sheffield
  Date: Mar, 30, 2016

- **Mineral growth close to equilibrium**
  Lecturer: Dr. Alexander E.S. Van Driessche, Institut des Sciences de la Terre Grenoble, CNRS, França
  Date: Jan, 27, 2016

- **Life and Role of Geologists in the Oil Industry**
  Lecturer: Dr. Óscar Fernández, Structure and Tectonics Groups, REPSOL
  Date: Apr, 6, 2016

- **Petroleum Exploration and Structural Geology: From Seismic Interpretation to Fracture Modelling**
  Lecturer: Dr. Óscar Fernández, Structure and Tectonics Groups, REPSOL
  Date: Apr, 6, 2016

- **Velocity Modeling for Time-to-depth Conversion: Examples and Pitfalls**
  Lecturer: Antonio J. Velásquez, Sr. Geologist & Geophysicist – QI Team Leader, Ecopetrol S.A.
  Date: Apr, 7, 2016

- **Numerical modelling of accretionary wedge dynamics: from rheological constraints to seamount subduction**
  Lecturer: Dr. Jonas Ruh, SNSF Advanced PostDoc Fellow at ICT-JA-CSIC
  Date: Apr, 26, 2016

- **Evidencias en Iberia de la amalgamación de Pangea y el inicio de su ruptura**
  Lecturer: Dr. Cecilio Quesada, Instituto Geológico y Minero de España, (IGME)
  Date: Apr, 28, 2016

- **Study of the lithopshere in the carpathian-pannonian region: based on integrated interpretation of gravity field**
  Lecturer: Dr. Miro Beilik, Department of Applied and Enviromental Geophysics. Faculty of Natural Sciences, Comenius University
  Date: May, 17, 2016

- **Video-Fòrum: Els problemes geològics als embassaments**
  Lecturer: Jordi Coromines (UPC), Antonio Casas (U. Zaragoza), Joan Manuel Vilaplana (UB)
  Date: May, 19, 2016

- **The Water Content of the Juan de Fuca Plate Entering the Cascadia Subduction Zone**
  Lecturer: Dr. Juan Pablo Canales, Woods Hole Oceanographic Institution (WHOI)
  Date: May, 25, 2016

- **Towards in situ water flux quantification in vadose zone using SP measurements**
  Lecturer: Dr. Damien Jougnot, CNRS, UMR METIS, Université Pierre et Marie Curie, França
  Date: June, 7, 2016

- **3D resistivity and density structure of La Soufrière volcano (Guadeloupe) from electrical resistivity and muon tomography data: insights into the hydrothermal system and associated hazards**
  Lecturer: Dra. Marina Rosas-Carbajal, Institut de Physique du Globe de Paris, França
  Date: June, 8, 2016

- **Estilos de colisión en la Cordillera Bética**
  Lecturer: Dr. Antonio Pedrera, IGME. Área de geología, geomorfología y cartografía geológica.
  Date: June, 21, 2016

- **Avances en caracterización sísmica somera de alta resolución**
  Lecturer: Dr. Ignacio Marzán (ICTJA-CSIC), Dr.David Martí (ICTJA-CSIC), Jean Kormann (Barcelona Supercomputing Center)
  Date:June, 22, 2016

- **Ocean redox chemistry at the dawn of metazoan radiation**
  Lecturer: Dr. Romain Guilbaud, Dept. Earth Sciences, University of Cambridge, Regne Unit
  Date: June, 27, 2016

- **Sub-ice volcanism, ice sheets and the survival of Life**
  Lecturer: Dr. John Smellie, Department of Geology, University of Leicester (UK)
  Date: June, 30, 2016

- **Estudios volcanológicos y petrológicos aplicados a algunas de las calderas geotérmicas de México**
  Lecturer: Dr. José Luís Macías, Instituto de Geofísica, UNAM, Mèxic
  Date: Jun, 29, 2016

- **Onshore study of the Namibe basin (Angola): structural, stratigraphic and diagenetic evidence associated to the Early Cretaceous Central Atlantic opening**
  Lecturer: Dr. Emilio Casciello (ICTJA-CSIC) and Mar Moragas (ICTJA-CSIC)
  Date: Jul, 5, 2016

- **An introduction to the Irish carbonate-hosted Zn+Pb4Ba4Ag deposits**
  Lecturer: Prof. Adrian Boyce, University of Glasgow and Scottish Universities Environmental Research Center
  Date: July,7, 2016

- **Tectono-sedimentary evolution of minibasins in foreland fold-and-thrusts belts. The central Sivas basin, Turkey**
  Lecturer: Charlie Kergaravat, Université de Pau et des Pays de l'Adour, Pau, França
  Date: Oct, 06, 2016

- **Un modelo matemático para avanzar en el conocimiento del comportamiento del ascenso del magma ácido en tres diques del SE de España**
  Lecturer: Dr. Francisco Pla, Dpto. Matemáticas. Facultad de Ciencias y Tecnologías Químicas, Universidad de Castilla-La Mancha, Espanya
  Date: Oct, 28, 2016

- **The Kimberlite 'Puzzle'**
  Lecturer: Dr. Andrea Giuliani, KiDs (Kimberlites and Diamonds), School of Earth Sciences, The University of Melbourne, Austràlia
  Date: Nov, 07, 2016

- '**Understanding subduction zone topography through modelling of coupled shallow and deep processes' an ITN-SUBITOP project**
  Lecturer: Kittiphon Boonma, SUBITOP Early Stage Researcher (ESR) and Ajay Kumar, SUBITOP Early Stage Researcher (ESR)
  Date: Nov, 07, 2016

- **6 grandes hitos de la perforación científica en los océanos del IODP**
  Lecturer: Dra. María José Jurado, Institut de Ciències de la Terra Jaume Almera
  Date: Nov, 22, 2016 12:00 am

COURSES

- **Curso Teórico-Práctico de ICP-MS 2016**, ICTJA-CSIC, Barcelona, Spain, 25-27 May, 2016, José Luis Fernández-Turiel, Marta Rejas
- **Curso de Posgrado en Paleoecología 2016**, ICTJA-CSIC, Barcelona, Spain, 6-17 June 2016, Valentí Rull, Santiago Giralt, Encarni Montoya, Teresa Vegas Villarúbia
- **Curso Internacional de Vulcanología 2016**, Fundació d'Estudis Superiors d'Olot (FES) and ICTJA-CSIC, Olot, Spain, 10-23 October 2016 , Joan Martí, Adelina Geyer, Steffania Bartolini, Xavier de Bolós
- **Procesamiento de señales de ruido sísmico ambiente**, Facultad de Ciencias Astronómicas y Geofisicas de la Universidad Nacional de la Plata, La Plata, Argentina, 13-20 december 2016, Martin Schimmel
- **Máster Geología y Geofísica de Reservorios: Caracterización sísmica de almacenes geológicos**. Departamento Geodinámica I Geofísica, Universidad de Barcelona, Barcelona, Spain, 2016, Ramon Carbonell
- **Máster Recursos Geológicos e Ingeniería Geológica: Caracterización de almacenes geológicos**. Departamento Geología, Universidad de Oviedo, Oviedo, Spain, 2016, Ramon Carbonell
- **Curso Posgrado de Imágenes Sísmicas y Caracterización del Subsuelo**, Facultad de Ciencias Exactas, Física y Naturales, Universidad de San Juan, Argentina, 2016, Ramon Carbonell
- **Lithospheric Dynamics course of the Master Reservoir Geology and Geophysics**, Universitat de Barcelona (UB) & Universitat Autònoma de Barcelona (UAB), Spain, 2015-2016, Daniel García-Castellanos, Ivone Jiménez-Munt, Jaume Vergés, Manel Fernàndez.
- **Postgraduate Course on topography and relief evolution using TISC**, ICTJA-CSIC, Barcelona, Spain, 2016, Daniel García-Castellanos

Participants of the Curso Internacional de Vulcanología 2016. (Author: FES Olot)

Curso Internacional de Vulcanología 2016 session. (Author: FES Olot)

ICP-MS Course 2016 session. (Author: Jordi Cortés)

Participants of the ICP-MS Course 2016. (Author: Jordi Cortés)

Participants of the Curso de Posgrado de Paleoecología 2016. (Author: Jordi Cortés)

Curso de Posgrado de Paleoecología 2016 session. (Author: Jordi Cortés)

4th ICTJA PhD STUDENT PRESENTATION AWARDS 2016 (ICTJA-CSIC)

Six ICTJA-CSICS PhD students applied for this year PSPA edition: Mireia Peral and Mar Moragas presented their scientific works in poster format while Pilar Sánchez, Juvenal Andrés, Cristina Biete and Ajay Kumar did so in the section of oral presentations.

Participants of the ICTJA-CSIC PhD Student Presentation Award 2016.

Pilar Sánchez Sánchez-Pastor

Winner of oral presentation

Advantages using Phase Cross-Correlation for searching temporal structural changes. Application to 2011 El Hierro eruption

During the last decade our understanding of the seismic noise wave field has improved and its importance has increased in some areas of the Geophysics, for example, tomography and monitoring. The seismic noise is a continuous vibration of the ground due to diverse natural and artificial sources although it is mostly generated by oceanic wave interactions. Those sources create seismic waves that travel through the Earth and therefore contain valuable information about its characteristics. The seismic response of the medium can be extracted by correlations between two temporal series. For monitoring studies, it is necessary to

find a frequency band where the seismic noise field is stable and does not change its properties.

In this work, we present different correlation strategies and apply them to synthetic and field data. We compare the classical and phase correlation and analyse the requirement of doing a pre-processing of the data in each approach. We further discuss the different results obtained with lineal and time frequency phase weighed stack. Depending on the study goals, the best processing is one of the possible method combinations. We show some examples of real applications to demonstrate the benefits and limitations of these methods.

Once the different processes have been explained, we focus on finding temporal structural changes due to the 2011 El Hierro eruption. To do so, we are working with data recorded by the IGN network during 2011 and 2012. The main problem that we have encountered is avoiding the tremors. We have calculated auto-correlations of all available data and extracted interesting observations. We want to remark this study is work in progress and we show preliminary results.

Pilar Sánchez-Pastor[1] and Martin Schimmel[1]
[1] ICTJA-CSIC, Lluís Solé i Sabarís s/n, 08028 Barcelona, Spain

Pilar Sánchez and Mar Moragas, winners of the ICTJA-CSIC PhD Student Presentation Award 2016.

Mar Moragas Rodríguez

Winner of poster presentation

Diapiric architecture controlled by syn- and post-extension prograding sedimentary wedges.

Analogue modelling has been previously applied to the analysis of the impact of the progradation of a sedimentary system above a ductile layer, representing the source of diapirs such as salt, evaporite-bearing deposits or overpressured shales. Previous published works show that diapiric architecture increases in complexity with lobe progradation, basement topography beneath the ductile layer and with the confluence of two sedimentary wedges. The outstanding results obtained in all these models, however, did not consider ongoing tectonic processes during diapirism.

We present 3 models with two tectonic phases (extension and post-extension) with different timing of progradation of sedimentary wedge in order to analyse how the time relationship between extension and sedimentary progradation control the formation of diapiric structures and their geometries. Additionally, 2 models with a final compression phase have been used in order to study how the Alpine orogeny affected the Early to Middle Jurassic salt diapirs of the Central High Atlas (Morocco).

Models with extension and post-extension phases show that the ratio between diapir growth and sedimentation rates and the amount of sedimentary loading on top of a ductile layer influence the shape of the diapirs, enhance or hamper the formation of diapiric extrusions, and have a clear impact on the evolution of incipient diapiric structures to more evolved phases. Additionally, our results also highlight that the time of the onset of the progradation of the sedimentary wedge and the relative thickness of the sedimentary cover beneath the prograding system have a major impact on the final distribution of diapirs in a basin.

The models including compression show that the presence and location of diapirs clearly controls the distribution of the deformation associated with the inversion, primarily affecting the sedimentary cover fossilizing diapirs. This deformation patterns have been also observed in the Tazoult-Azourki diapirs (Central High Atlas, Morocco) that have been inverted and compressed during the Alpine orogeny. This study provides key information that can be applied to other localities of the Central High Atlas diapiric basin and similar scenarios elsewhere.

Mar Moragas[1], Jaume Vergés[1], Thierry Nalpas[2], Eduard Saura[1], Juan-Diego Martín-Martín[3], Grégoire Messager[4], David William Hunt[4]

[1] Group of Dynamic of the Lithosphere (GDL), Institute of Earth Sciences Jaume Almera, ICTJA-CSIC, Lluís Solé i Sabarís s/n, 08028 Barcelona, Spain
[2] Géosciences Rennes, Université de Rennes 1, UMR 6118 CNRS, 35042 Rennes cedex, France
[3] Grup de Geologia Sedimentària, Departament de Geoquímica, Petrologia i Prospecció Geològica. Universitat de Barcelona (UB), Martí i Franquès s/n, 08028 Barcelona, Spain
[4] Statoil, TDP RDI CPR CP, Sandsliveiein 90, 5020, Bergen, Norway

OUTREACH

The scientific and technical staff of the institute continued in 2016 with the task of bringing science to society through a series of activities to disseminate the scientific knowledge on Earth Sciences, mainly resulting from the research projects carried out at ICTJA. One of the main objectives is to bring science to young people to promote scientific vocations.

In this sense, trying to reach the public as possible, outreach activities focused on showing the relevant role that Earth sciences in society, from the aspects related to geological hazards to the importance of raw materials in the technological development.

As a example of this dissemination effort, Science Week, which takes place every November, is one of the most important outreach events of the year for ICTJA-CSIC . During five days, ICTJA-CSIC researchers propose several workshops to the secondary school students that visit our Institute.

Similar workshops and visits have been prepared for the ESCOLAB, in which ICTJA-CSIC participates for the first time in 2016.

Moreover, some of the ICTJA researchers visit elementary and secondary schools during the year offering some workshops closely related with Earth Sciences knowledge.

Recerca a les ciències de la Terra, EspaiCiència, Saló de l'Ensenyament, Fira de Barcelona
Co-organized by ICTJA-CSIC and Facultat de Geologia (UB), 9-13 March 2016, Barcelona

Science Week 2016

Què investiguem a les Ciències de la Terra? Setmana de la Ciència 2016
Organized by ICTJA-CSIC, 14-18 November 2016, ICTJA-CSIC, Barcelona
Almost 100 estudents from 4 secondary schools visited ICTJA-CSIC facilities and they took part in the following outreach activities (workshops and talks) proposed by our researchers:

"Augmented Reality Sandbox. Evolución del relieve de la Tierra" by Daniel García-Castellanos and Ángel Valverde
"Tierra de volcanes" by Adelina Geyer
"Explorando el subsuelo: sondeos científicos y sondas geofísicas" by María José Jurado
"Regreso al futuro; pistas del pasado en los registros sedimentarios" by Encarni Montoya & Santiago Giralt
"¿Cómo se investiga en los laboratorios de las Ciencias de la Tierra?" by Marta Rejas
"¿Cómo se registran los terremotos?" by Pilar Sánchez Sánchez-Pastor & Jordi Díaz

Visiting secondary schools during Science Week 2016:
- **IES Milà i Fontanals (Barcelona)**, 14 November 2016
- **IES Torres i Bages (L'Hospitalet de Llobregat)**, 15 November 2016 & 16 November 2016
- **IES Bernat Metge (Barcelona)**, 17 November 2016
- **IES Domenech i Muntaner (Barcelona)**, 18 November 2016

ESCOLAB 2016-2017
Coordinated by Ajuntament de Barcelona and organized by ICTJA-CSIC, 28 October 2016, ICTJA-CSIC, Barcelona
18 students from Institut Can Planes, Barberà del Vallès, visited ICTJA-CSIC and took part on the following outreach workshops:
"Paleoclima" by Santiago Giralt
"L'evolució del relleu terrestre amb una Taula de Sorra amb Realitat Augmentada" by Daniel García Castellanos & Ángel Valverde

Talks and workshops

"Busquem Terratrèmols" by Jordi Díaz Cusí
Institut Montserrat Roig, 14 January 15 – 9 February 2016, Sant Andreu de la Barca
Escola Pia, 24 February 2016 -16 March 2016, Granollers
Col.legi Jardí, 20 May 2016 – 1 June 2016, Granollers
Col.legi Sant Marc, 11 October 2016 – 2 November 2016, Barcelona

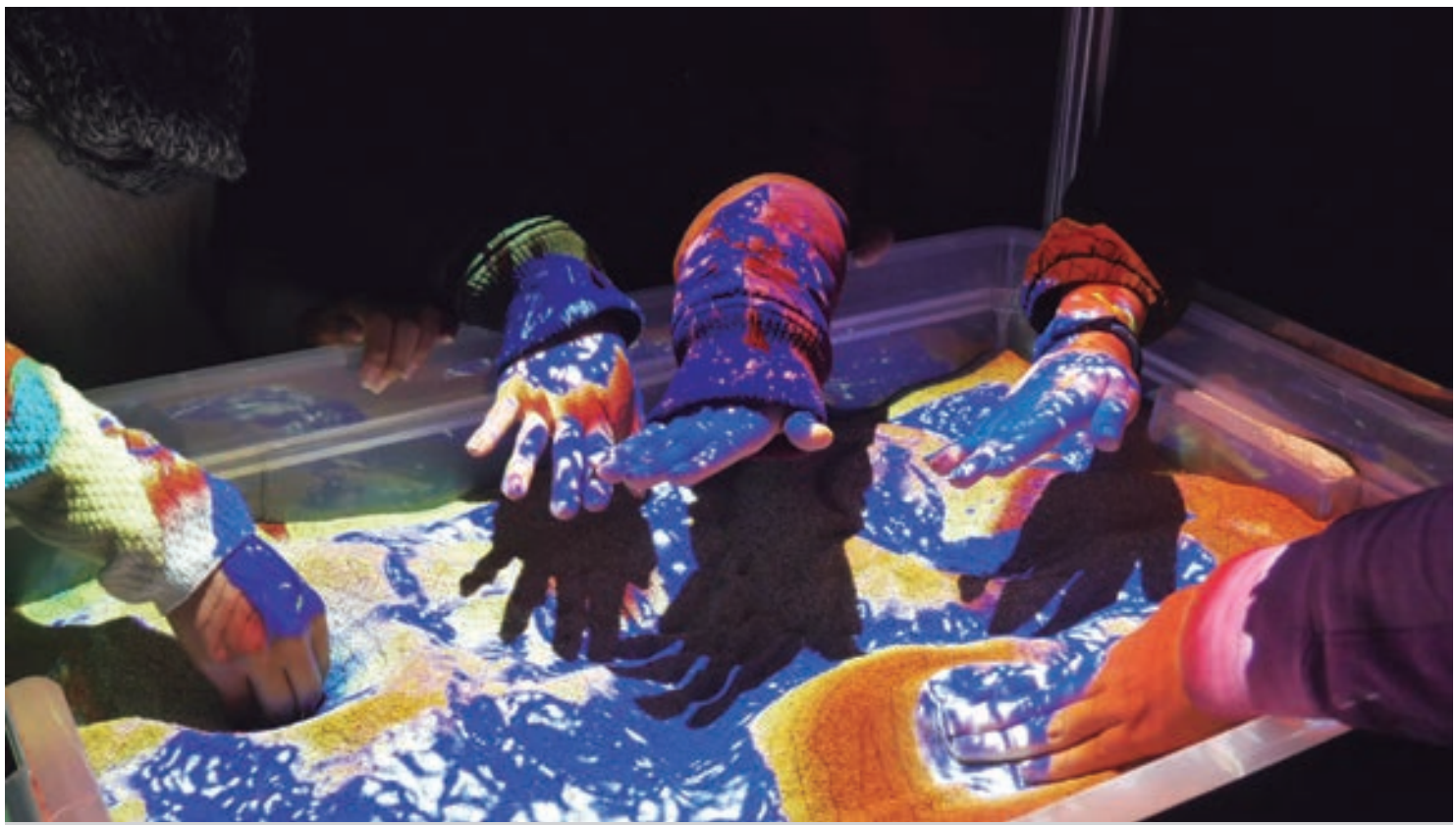
Institut Sant Quirze, 17 November 2016–15 december 2016, Sant Quirze del Vallés

"Parlem de Terratrèmols" by Jordi Díaz Cusí
Acadèmia Igualada, 4 May 2016, Igualada
Col·legi Montserrat, 26 September 2016, Barcelona

"Terra de volcans" by Adelina Geyer
Escola Pública l'Alzina, 3 June 2016, Molins de Rei

Training
Viquipèdia com a eina docent per a l'ensenyament superior, Seminari de formació del professorat, Facultat de Geologia de la Universitat de Barcelona, 16 November 2016, Daniel García-Castellanos

BCN Rocks
BCN Rocks is an application for personal mobile devices developed by ICTJA-CSIC and Faculty of Geology of Universitat de Barcelona. It was released in 2016. This app is suitable for secondary and high school students as well as general public without a solid background in Earth Sciences. The main objective os this app is to teach Geology using as learning source Barcelona's city façades and pavements. Additionally, BCN Rocks provides a short explanation about the significance of the appearance of different rock types at the differnt historical periods in the city. Although it has been designed as a playful learning resource for secondary school students, the level of knowledge also allows bringing some basic concepts an principles of Earth Sciences to the general public, irrespective of age.



Students using the ICTJA-CSIC AR Sandbox during the Science Week 2016. (Author: Jordi Cortés)

In the media

ICTJA-CSIC scientists contributed in the media to disseminate issues with ongoing research projects and to assist in the explanation news events related to the Earth Sciences. TV, radio and newspaper, printed and digital, published someof the following informations based on press releases elaborated by ICTJa-CSIC Communication Unit.

Here we present some of the aparitions of ICTJA-CSIC's researchers in the media in 2016.

- *España sufre amnésia sísmica* 25/01/2016, El Mundo
- *Los terremotos del sur de España Explicados en 5 minutos*, 25/01/2016, Hipertextual
- *Encuentran las huellas fósiles más antiguas de Catalunya en Lleida*, 09/02/2016, Europa Press
- *Hallan en el Pallars Jussà las huellas fósiles más antiguas de Catalunya*, 09/02/2016, La Vanguardia (digital)
- *Descubren las huellas más antiguas de Cataluña: 290 millones de años*, 09/02/2016, ABC
- *Rastros de animales revelan las huellas más antiguas de Cataluña*, 09/02/2016, SINC
- *Identificadas las huellas más antiguas de Cataluña*, 10/02/2016, El País
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- *Encuentran las huellas fósiles más antiguas de Cataluña en Lleida*, 10/02/2016 El Periódico (digital)
- *Un estudi descriu el temps que triga el magma a preparar-se per fer erupció*, 17/02/2016, Diari de Girona
- *Les erupcions volcàniques més freqüents avisen 2 anys abans*, 17/02/2016, Regió 7
- *Un estudio describe las fases que preceden a las erupciones volcánicas más frecuentes*, 20/02/2016, Noticiasd e la Ciencia y la Tecnología
- *Un estudio describe el tiempo que tarda el magma en prepararse para la erupción*, 16/02/2016, El Periódico (digital)
- *Un grupo de científicos determina el tiempo que tarda el magma en prepararse para hacer erupción*, 16/02/2016, 20 Minutos
- *Un estudio describe el tiempo que tarda el magma en prepararse para la erupción*, 16/02/2016, El Día
- *Un estudio describe el tiempo que tarda el magma en prepararse para la erupción*, 16/02/2016, Diario de Córdoba
- *Un estudio describe el tiempo que tarda el magma en prepararse para la erupción*, 16/02/2016, Diario de León
- *Un estudio describe el tiempo que tarda el magma en prepararse para la erupción*, 16/02/2016, La Vanguardia (digital)
- *Expertos auguran más terremotos en el mar de Alborán los próximos días*, 15/03/2016, El Economista.es
- *Expertos auguran más terremotos en el mar de Alborán los próximos días*, 15/03/2016 Servimedia
- *Expertos auguran más terremotos en el mar de Alborán los próximos días*, 15/03/2016, La Información
- *Nuevo mineral en el Pirineo catalán: la Abellaïta*, 05/04/2016, Europa Press
- *La abellaïta: nueva especie mineral descubierta en el Pirineo de Lleida*, 05/04/2016, El Periódico (digital)
- *Descubren por pirmera vez un mineral nuevo en Catalunya, la Abellaïta*, 05/04/2016, La Vanguardia (digital)
- *Descubren por pirmera vez un mineral nuevo en el pirineo de Lleida: la Abellaïta*, 05/04/2016, El Día
- *Una nueva especie mineral en el Pirineo de Lleida: la Abellaïta*, 05/04/2016, SINC
- *Descobreixen a la Torre de Capdella un mineral nou a Catalunya*, 05/04/2016, Segre
- *Descobreixen a la Torre de Cabdella un nou mineral que s'anomena "Abellaïta"*, 06/04/2016, La Mañana
- *Els 'terratrèmols' de Suárez*, 06/04/2016, El Periódico (digital)
- *Así "vió" un sismógrafo los dos goles de Luis Suárez al Atlético de Madrid*, 06/04/2016, Sport
- *No es broma, los goles de Luis Suárez provocaron un sismo*, 06/04/2016, La Opinión
- *Se comprobó que sus dos goles provocaron un pequeño terremoto*, 07/04/2016, República.com
- *"Espai Terra", entrevista a Jordi Díaz*, 06/04/2016, TV3
- *La deforestación de la Isla de Pascua no se produjo sólo por la presión humana*, 13/04/2016, SINC
- *Los ancestrales habitantes de la Isla de Pascua no fueron los causantes de su deforestación*, 14/04/2016, Ancient Origins
- *Las causas de la deforestación de la Isla de Pascua no fueron solo antropogénicas*, 19/04/2016, Scientific American
- *Un estudio revela que la deforestación de la Isla de Pascua fue gradual*, 18/04/2016, El Confidencial

- *Las causas de la deforestación de la Isla de Pascua no fueron sólo antropogénicas*, 15/04/2016, Investigación y Ciencia
- *La deforestación de la Isla de Pascua no se produjo sólo por la presión humana*, 18/04/2016, OEI Divulga
- *Un estudio revela que la deforestación de la Isla de Pascua fue gradual*, 18/04/2016, La Vanguardia (digital)
- *Un estudio revela que la deforestación de la Isla de Pascua fue gradual*, 18/04/2016, Diario de Navarra
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- Pascua se quedó sin árboles no sólo por la acción humana, 14/04/2016, Muy Interesante
- *Nueva evaluación integral de la historia de la Isla de Pascua*, 08/04/2016, El Día
- *Clues to collapse*, June 2016, Natural History
- *What actually happened on Easter Island?*, 10/04/2016, Newsroom America
- *What actually happened to Easter Island's civilization?*, 10/04/2016, USA News Headlines
- *What actually happened to Easter Island's civilization?*, 10/04/2016, Business Standard
- *What happened on Easter Island? Downfall of ancient Rapa Nui civilisation was 'gradual process'*, 11/04/2016, International Business Times
- *What really happened on Easter Island?*, 07/04/2016, EurekAlert! (AAAS) (April 2016)
- *What really happened on Easter Island?*, 08/04/2016, Science Newsline
- *¿Qué pasó realmente en la Isla de Pascua?*, 10/04/2016, Europa Press
- *What really happened on Easter Island?*, 08/04/2016, Science Daily
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- *Un nuevo terremoto de magnitud 6,1 sacude Ecuador*, 20/04/2016, Diario Presente
- *¿Por qué se produjo el terremoto de Ecuador?*, 19/04/2016, El Diario de Chihuahua
- *Uno de los seísmos más intensos de la historia de Ecuador*, 18/04/2016, ABC
- *¿Cuáles son los países con mayor riesgo de sufrir el próximo Gran Terremoto?*, 19/04/2016, La Gran Epoca
- *"L'Efecte Papallona", entrevista a Santiago Giralt*, 03/05/2016, Què-quicom, Canal 33
- *La civilización de la Isla de Pascua no se autodestruyó*, 23/05/2016, El Periódico (digital)
- *La historia del paraíso, bajo el Lago dos Nenos*, 23/06/2016, El Faro de Vigo
- *Rock hounds are on the hunt for new carbon minerals*, 04/10/2016, Science News
- *El primer nuevo mineral descubierto en Catalunya se pesenta en público*, 02/12/2016, La Vanguardia (digital)
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- *El turismo amenaza "El Mundo Perdido" de Arthur Conan Doyle*, 19/08/2016, Agencia SINC
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- *Investigadores españoles alertan del peligro que supone la actividad turística en la montaña del Escudo de Guayana*, 19/08/2016, Cuatro
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- *El turismo amenaza "El Mundo Perdido" de Arthur Conan Doyle*, 22/08/2016, Noticias de la Ciencia y la Tecnología
- *El turismo amenaza "El Mundo Perdido" de Arthur Conan Doyle*, 19/08/2016, El Boletín
- *El turismo amenaza "El Mundo Perdido" de Arthur Conan Doyle*, 19/08/2016, La Gran Época
- *El turismo amenaza "El Mundo Perdido" de Arthur Conan Doyle*, 19/08/2016, EcoDiario.es
- *Investigadores españoles alertan del peligro que supone la actividad turística en la montaña del Escudo de Guayana*, 19/08/2016, La Vanguardia (digital)
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- *Un seísmo próximo a la superficie y destructor*, 24/08/2016, El País
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- Terremoto de Amatrice: el centro de Italia, un 'polvorín' geológico, 24/08/2016, El Mundo
- *Melilla recuerda su terremoto tras el drama en Italia con un temblor de la misma magnitud*, 25/08/2016, Melilla Hoy
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- *Tourism is threatening Arthur Conan Doyle's Lost World*, 06/09/2016, ScienceDaily
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- *Científicos alertan que peligran ecosistemas del Escudo Guayanés por turismo*, 06/09/2016, La Vanguardia (digital)
- *Las plantas invasoras y las bacterias humanas amenazan la Guayana de América del Sur*, 09/09/2016, National Geographic
- *El turismo amenaza "El Mundo Perdido" de Arthur Conan Doyle*, 02/09/2016, DiCYT
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- *Científicos del CSIC monitorizan la falla de Al-Idrissi, causante del mayor terremoto en el Mar de Alborán*, 14/09/2016, ABC
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- *Despliegan sismómetros en el mar de Alborán para estudiar una falla submarina*, 14/09/2016, El Día
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- *Los sismógrafos no sólo miden terremotos, también detectan tormentas lejanas*, 21/09/2016, EFEVerde
- *Un sismómetro de los Pirineos registró el huracán Sandy de Nueva York*, 22/09/2016, SINC
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- *Sismómetro de los Pirineos registró el huracán Sandy de 2012*, 21/09/2016, Salmantino
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- *Científicos reconstruyen el clima de la Península Ibérica de los últimos 2.200 años*, 29/09/2016, EFEVerde
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- *¿Cómo fue el clima de la Península Ibérica de los últimos 2.200 años?*, 03/10/2016, IAGUA
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- *Un estudio científico en la laguna Cimera (Gredos) permite reconstruir el clima del centro de la Península Ibérica de loa últimos 2.000 años*, 05/10/2016, Agencia ICAL
- *En Gredos se estudia el clima de los últimos diez mil años*, 11/10/2016, Cadena SER Ávila
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- *Un estudio en Gredos reconstruye el clima de los últimos dos mil años*, 07/10/2016, Gredos.info
- *El mejor lugar para desaparecer*, 09/10/2016, EL Páis
- *¿Por qué se ha producido el segundo terremoto más fuerte de Italia?*, 30/10/2016, Hipertextual

- *BCN Rocks, una 'app' para descubrir la geología en las calles de Barcelona*, 04/11/2016, SINC
- *BCNRocks*, 19/12/2016, "Verd primera", BTV
- *¿Con qué tipos de rocas se construyó Barcelona?*, 03/11/2016, La Vanguardia (digital)
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- *Jugar a ser geólogos por edificios de Barcelona*, 11/11/2016, El Periódico (digital)
- *Imagen de la noticia para bcn rocks* de La Razón
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- *¡Asombroso! Averiguan dónde se ahogó una menor gracias a este hallazgo*, 13/11/2016, EPMundo
- *La història del primer mineral descobert a Catalunya*, 09/12/2016 Diaria Ara,
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The presence in the general media is reinforced by the three main channels of information launched the Institute: the institutional web page (http://www.ictja.csic.es) and the Twitter and Facebook accounts. These new digital channels offer a wide range of possibilities to disseminate content related with research and institutional activity of ICTJA-CSIC.


La civilización de la Isla de Pascua no se autodestruyó

ICTJA-CSIC researcher, Jordi Ibáñez, attending the media. (Author: Jordi Cortés)

Teide viwed from Rique. Tenerife, Spain. (Author: Lavinia Tunini)

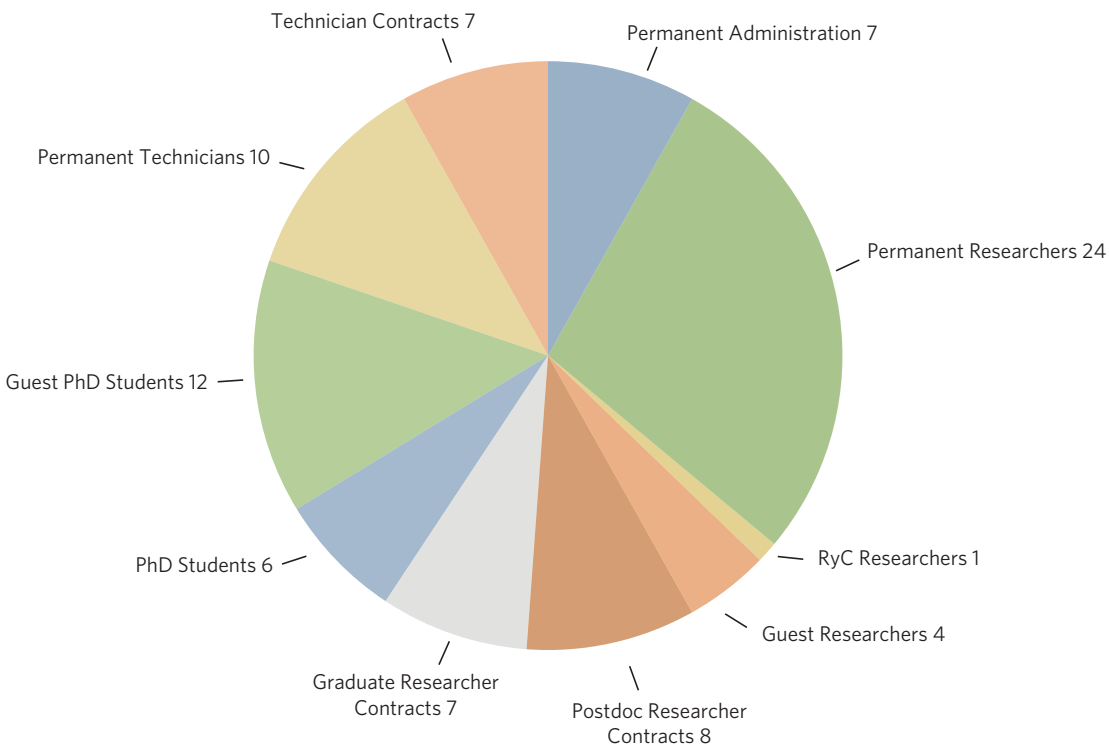
ICTJA in numbers

PERSONNEL

Researchers 72% Technicians-Others 28%

PERSONNEL TOTAL = 86

Date 31/12/2016



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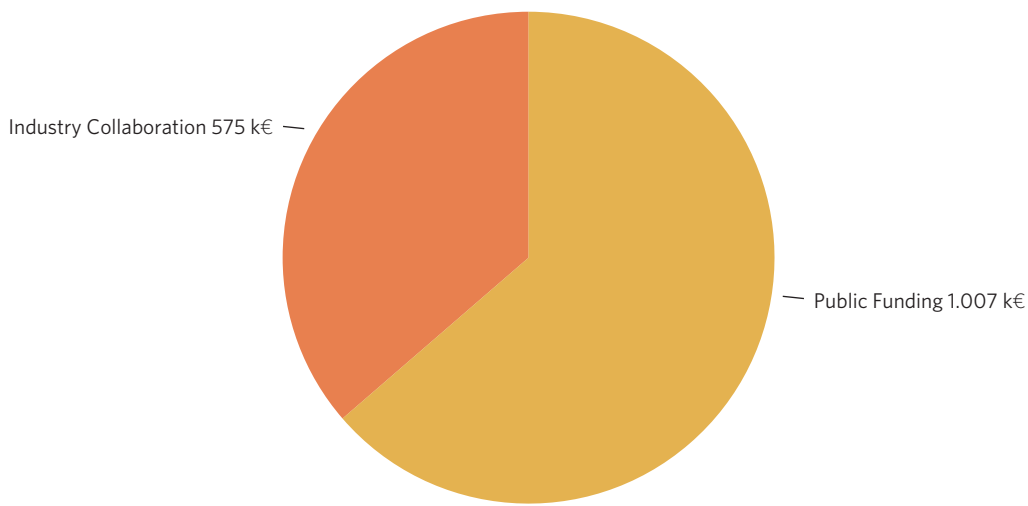

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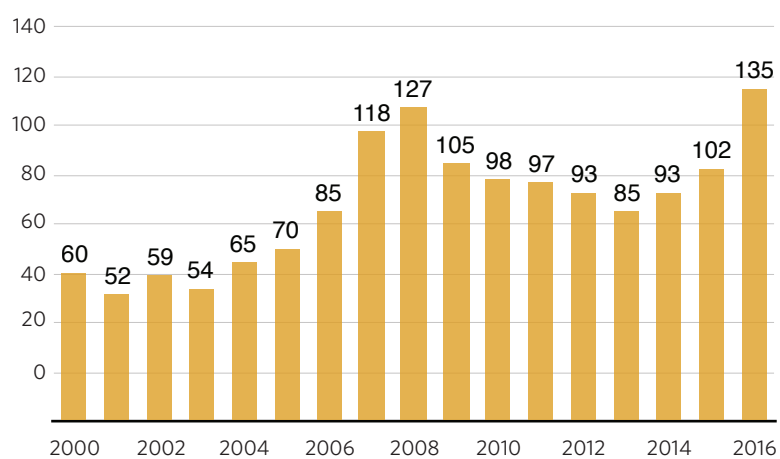

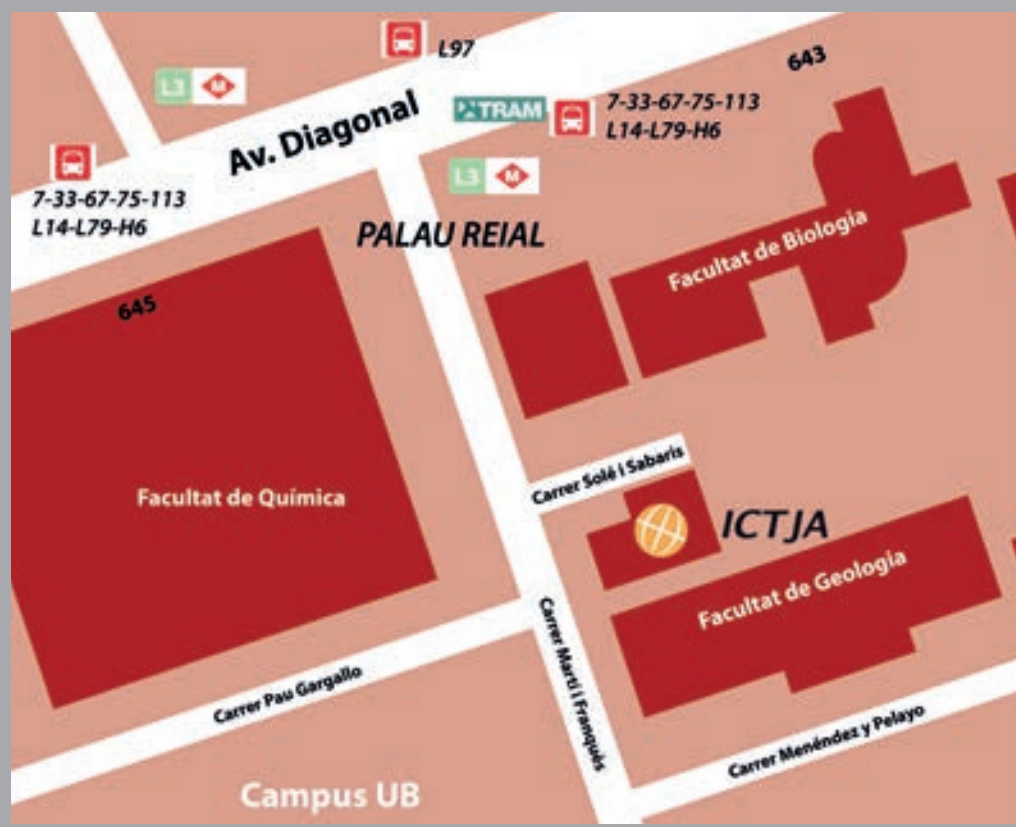

The Institute of Earth Sciences Jaume Almera (ICTJA-CSIC) is located at the Pedralbes Campus of the University of Barcelona

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